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A
Half Century
of
Chicago Building

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A Half Century *of* Chicago Building

*A PRACTICAL
REFERENCE GUIDE*

All Building Laws and Ordinances
Brought to Date

*Historical, Technical and Statistical Review of the
Construction and Material Development of
America's Inland Metropolis*

John H. Jones + Fred A. Evers

CHICAGO... 1910

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Edited by

HON. JOHN H. JONES

CHAIRMAN
CITY COUNCIL BUILDING COMMITTEE

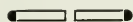
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CITY COUNCIL BUILDING COMMITTEE



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INTRODUCTION



HIS is an era of construction, and no city in the world better typifies the age than Chicago. The building of this great metropolis of two and a half million people, within the span of less than half a century, stands as a marvel of constructive achievement.

For the Chicago of today, with its towering buildings reared on foundations laid deep underground, with its miles of harbor frontage and inland docks, its great drainage canals, its tunnels bored under the city and under the Lake, its countless factories and endless miles of modern homes, its parks and circling suburbs, has practically all been builded since the great conflagration of 1871 cleared the ground for the rebuilding of the modern metropolis.

By reason of its new start and the progressive character of its citizens, Chicago has been particularly responsive to modern advances in the builder's craft and foremost to adopt and apply all improvements and changes in structural materials and methods.

The most adverse conditions confronted Chicago's builders. The site lay on low, boggy ground offering no secure foundation for buildings and no solid material in which to tunnel beneath the surface; the level plain afforded no natural drainage, yet modern building science has set the great city securely in its place, reached out beneath the surface of the bordering inland sea for water on the one side, and connected its drainage system with the Gulf of Mexico on the other; a net-work of tunnels underlies its streets, and the construction of adequate sub-ways to solve its pressing traffic problems waits only upon capital.

The material accomplishments of the past are eloquent of the future. The great work of building Chicago has only begun, yet the peculiar nature and great magnitude of the problems of construction here encountered has brought correspondingly great advances in the adoption of improved materials and methods. All true progress must proceed under law and the ever changing conditions in the building world of Chicago have necessitated repeated revisions of the city's Building Code to keep it abreast with the times.

A careful historical and critical study of these developments in modern building science, as typified in Chicago, with a compilation of the legal regulations on the subject brought down to date, must be of greatest interest, not only to those who are actually engaged in the field of construction, wherever it may be, but also to every property owner and citizen whose interest lies in Chicago and its future development.

The editors of this work have spared no effort to make it a complete and comprehensive treatment of this subject in its broadest sense. To this end special articles by acknowledged authorities have been secured treating the most important developments in modern materials and methods of construction, and the great and peculiar problems yet awaiting the constructor in Chicago.

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Chicago=Historical

PHYSICAL environment has marked effect upon the structural growth and development of cities, as well as upon the character of their peoples. In the case of Chicago, located upon a strikingly level marshy plain, bordering the head and scarcely raised above the level of Lake Michigan, and traversed by sluggish streams, its unusual situation has had peculiar influence upon the city's growth and development. The flat, boggy land bordering the Lake offered no natural drainage, afforded no secure foundation for building, and provided very limited harbor facilities. In the erection of a gigantic city upon this unfavorable site, it has been necessary to solve the most difficult problems in building construction, especially in the matter of providing foundations for modern skyscrapers, by engineering works of immense magnitude to provide adequate drainage and water supply for the city, while, to make Chicago a port, it has been necessary to construct an artificial harbor and make the shallow winding streams threading the site of the city navigable for the largest vessels.

In view of the building and engineering problems which these physical conditions have occasioned, a brief description of the geological and topographical formation of the site of Chicago will be of interest. The plain on which Chicago now stands was at one time the bottom of an ancient lake, sometimes called by geologists, Lake Chicago, which, at its highest state, seems to have stood about sixty feet above the present level of Lake Michigan, and extended west to the ridges, bordering the level land in the vicinity of LaGrange. Out of this lake, at its various stages, rose as islands those elevations, now known as Blue Island, Stony Island, Mt. Forest, etc., names which suggest the early condition of these places. The various sandy ridges which here and there seam the plain, represent bars or spits formed by the action of the waters of the ancient Lake Chicago.

This lake was formed when the immense fields of glacial ice, that once covered the surface of this part of the country, began slowly to melt, and retreat to the north. By the diversion of the waters of the Chicago plain into the Mississippi basin, through the

building of the present Drainage Canal, the former drainage of this section is re-established, for the waters of Lake Chicago found their outlet to the southwest through the present valley of the Des Plaines and the Sag, following the course of the modern canal. To the north, any outlet for the waters of the lake was blocked by barriers of ice. At its highest stage the discharge of the waters of Lake Chicago through the valley now containing the Des Plaines River and the Drainage Canal was comparable to the present flow of water in the Niagara River, and below Lemont, where the floor of the valley descends rather steeply, must have been imposing rapids.

When the ice which covered the Chicago plain had retreated and allowed the waters of the former lake to subside from the site of the modern city, they left behind them a loose, level, unconsolidated deposit of soil, overlying the pre-glacial surface of the country. This deposit varies considerably in thickness over the bed-rock, showing that the land where Chicago now stands was formerly of a broken and undulating character. At its deepest point, along the North Branch of the Chicago River about a half mile above the forks, the bed rock is 124 feet below the level of Lake Michigan; at other points it crops above the surface of the Chicago plain. On this uninviting flat of loose spongy soil, deposited by the action of glaciers and lake, and intersected by sluggish water courses, was to be built the great city and port of Chicago.

The French, who came by the Great Lakes, were the first white people to arrive in the Illinois country. Father Marquette, a Jesuit missionary, and Louis Joliet, who represented the French government at Quebec, together explored the Mississippi River in 1673, and, early in the Fall of that year, on their return trip, ascended the Illinois and Des Plaines Rivers, and portaged to the Chicago River, thus being the first white people to visit the present site of Chicago. After them came by the Lakes French traders and adventurers, most noted among them La Salle and Tonty. These early French explorers must have visited the site of Chicago, and possibly

built there a temporary fort, but the place offered few attractions to them and they established their first settlement farther to the south along the Illinois and Mississippi Rivers.

Not for a century and a quarter after the first French came was any settlement of which we have certain knowledge made where the city of Chicago now stands. August 17, 1803, Captain John Whistler and a company of soldiers arrived on the site of Chicago, where he found three or four Canadian French traders, and began the construction of Fort Dearborn. This was the beginning of building construction in Chicago. The fort was named for Henry Dearborn, then Secretary of War, and con-

by the Indians. Capt. Nathan Heald, then in command, abandoning the Fort on orders sent by Gen. Hull, was attacked by overwhelming numbers of Indians, who massacred the garrison and most of the accompanying women and children. Fifty-nine persons, including officers, two women and twelve children, were slain. The next morning the Indians burned the Fort, and with it every vestige of American authority disappeared from the region around Lake Michigan. Four years later, after the conclusion of the war with Great Britain, Fort Dearborn was rebuilt, but for many years thereafter only a trading post composed of scattered uninviting cabins occupied the site of the present city.



RESIDENCE OF JOHN KINZIE, ESQ.

By permission Chicago Historical Society. The first house built in Chicago.

sisted of four log houses and two block houses, the whole surrounded by a twelve foot palisade surmounted by pointed iron. In 1804, John Kinzie, then residing near Niles, Michigan, moved to Chicago having purchased the property of one of the four French traders then here. His house was on the north side of the river, and, for many years, was the only house of an English speaking settler where Chicago now stands. The chronicle of the life adventures of John Kinzie, Chicago's first settler, would rival in excitement those of Capt. John Smith.

Nine years after its construction had begun, on the 15th of August, 1812, Fort Dearborn was destroyed

In 1818, legislation of immense importance to the future city of Chicago was enacted by the Congress of the United States. The Ordinance of 1787, relating to the Northwest Territory, had provided that either one or two states might be formed out of the territory lying north of a line drawn through the southerly bend of Lake Michigan. Had this provision been acted upon in its original form, Chicago would have been located in some other state than Illinois. On January 16, 1818, Nathaniel Pope, the delegate in Congress from Illinois, presented to the House of Representatives a petition from the Territorial Legislature praying the admission of Illi-

nois as a state of the Union. Shortly thereafter a bill enabling Illinois to become a state was passed by Congress which contained an amendment vital to Chicago proposed by Mr. Pope himself. By that amendment the northern boundary of the new state of Illinois was fixed at its present line 42° 30', disregarding the Ordinance of 1787, and bringing the present site of Chicago within the state so formed. The reasons advanced by Mr. Pope in support of his amendment were prophetic of the city's future:— that in this way more attention would be drawn to

the Winter of 1833-4 amusements of any kind were few and far between. One fine moonlight night, when the ice was good, the whole of Chicago turned out for a skate and a frolic, and we had it. There must have been at least a hundred persons on the River between Wells Street and the forks." In June, 1834, the first steamer, the *Michigan*, entered the Chicago River. Population began now to increase more rapidly, and, four years after its incorporation as a village, Chicago was granted a charter as a city, March 4, 1837.



COURT HOUSE AND JAIL, 1848.

After painting owned by Chicago Historical Society.

the plan for a canal between Lake Michigan and the Illinois River and for improving the harbor of Chicago.

Between the years 1818 and 1830 Chicago advanced very slowly. In 1831-2 occurred the Black Hawk War. This had little direct effect upon the eastern part of the State, but is important as marking the last stand of the Indian against the white man in Illinois.

In 1833, while still a small straggling trading post, Chicago was incorporated as a village. Charles Cleaver, who came to Chicago in 1833, wrote: "In

The original city of Chicago contained a population of about 4000, and embraced about ten square miles of territory, extending from North Avenue to Twenty-second Street and from the Lake to Wood Street. There were six wards, two to each division, and the assessed valuation of its property was \$236,842. That portion of the city now embraced within the 21st Ward began from the start to furnish mayors for the city; William Butler Ogden, Democrat, representing the north division, was elected first Mayor of Chicago, May 2, 1837, over John H. Kinzie, Whig.

Construction problems in Chicago early assumed a political aspect. The first bridge over the Chicago River, at Dearborn Street, had been demolished and communication between the north and south sides was maintained by ferries at Clark and Dearborn Streets. Public sentiment was opposed to a bridge so far down the River as Dearborn Street, and the people of the south side were opposed to bridging the river at all and thus bringing the north side merchants into easier communication with visiting traders, who came in mainly from the South. After a close contest the north side won, and a bridge was built, 1840, at Clark Street, the expense of which was met largely by private subscriptions of the interested north side merchants. This bridge was a floating swing bridge, the first of the kind to be built in the West. The next year a similar bridge was established at Wells Street. By 1849 there were bridges at Clark, Wells, Randolph and Kinzie Streets, all of which were swept away by the great flood of 1849.

The building of Chicago had an inauspicious beginning. The panic of 1837 came on and business was at a standstill; many merchants abandoned the city and returned to the East, but many dauntless settlers remained, putting full faith in the future of the city, and reaped their reward when the period of depression at last was over. Northern Illinois was steadily filling with settlers; the completion of the Erie Canal opened easy communication with the East, and Chicago began to assume importance as a lake port. By 1850 it had a population of 30,000. In 1848 the Galena and Chicago Union Railroad ran the first train out of Chicago; by 1850 this road had been completed as far west as Elgin. In 1853 the feasibility of connecting the North and South Sides with a tunnel was discussed at a public meeting.

Another important constructive achievement during this period, the building of the Illinois and Michigan Canal, opened a water way between Chicago and the older settlements along the Illinois River, and first linked together the commerce of the Great Lakes and the Mississippi River. The project of a canal connecting Lake Michigan with the Illinois River had been talked of for years. As has been seen, it was already in contemplation when Illinois was admitted as a state, in 1818, with its boundary

pushed north to include Chicago. In 1835 the State Legislature finally authorized a loan for the construction of the canal. By 1848 the work was completed, following closely the course of the present Drainage Canal, and for twenty years thereafter formed an important highway of commerce. To-day agitation for a deep waterway to the Gulf has supplanted thoughts of the old canal.

At the half-century mark, 1850, the phenomenal growth of Chicago may be said to have begun. From 30,000 in 1850, the city had increased to 110,000 in 1860, and to nearly 200,000 at the close of the War. This remarkable growth was mainly due to the tide of immigration now setting toward Chicago. Manufacturing industries sprang up, railroads were built, and commerce grew apace. The Illinois Central Railroad, encouraged by the State, was built, 1851-56, giving the whole interior of the state an outlet at Chicago. February 20, 1852, the first through train from the East entered Chicago over the Michigan Southern Railway. During the decade, 1850-1860, Illinois did more railroad building than any state in the Union, and by 1870 ranked first among the states in the total number of miles of railway.

Various public improvements were undertaken, but capital was still very scarce. There were no paved streets up to 1849, and the principal thoroughfares of the city were often impassable. In 1849-50 about three miles of plank road was laid. Plank and cobble stones, both of which proved very unsatisfactory and ill adapted to physical conditions in Chicago, remained the only pavements for several years; not until 1857 was macadam used and plank and cobble discarded. In 1852 the city secured a loan of \$250,000 in the East to be used for the construction of a new system of water-works. The greater part of the city was but a few feet above the level of the Lake and drainage early became one of the great problems. In 1855 the legal level of the city was raised seven feet, not without loud protest on the part of property owners affected, making the established level of the city about fourteen feet above Lake Michigan.

Still the remarkable growth of the city continued. The Civil War made heavy drains upon its people and the tide of immigration temporarily slackened, but, with the close of the War, the city grew again



LAKE AND STATE STREETS, 1865.

From original print owned by Chicago Historical Society.



CHAMBER OF COMMERCE, 1865

From original print owned by Chicago Historical Society.

with unprecedented rapidity. In 1871, on the eve of the great fire, Chicago was a city of nearly 350,000 inhabitants, one of the leading manufacturing and railroad centers of the country, and a port of the first importance. Numerous spacious hotels afforded ample accommodation for the many transients, and Chicago was already famed as a "convention city." It was up to this period that Chicago deserved the name "Garden City," or "Urbs in Horto," which it had adopted as its motto at its incorporation in 1837. Most of its houses were of frame, many scattered in open cultivated lots, and surrounded with shade trees and flowers.

The rebuilding of Chicago was begun under new laws and new conditions. The constitution of 1870 had expressly forbidden the granting of special charters or privileges to cities, and had limited cities in the amount of taxes they could raise, and the amount of money they could borrow. Just as the old city of Chicago encountered a financial panic at its birth, so the new city was confronted by the panic of 1873. But fire and panic could not daunt the Chicago spirit nor check the growth of the young metropolis. When Chicago was finally incorporated under the General Cities and Villages Act, in 1875, the city contained about 400,000 inhabitants. From the



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CHICAGO IN FLAMES.

October 9, 1871, the Great Fire broke out, and burned for three days. All but the outskirts of the great city that had been built at the head of Lake Michigan was devoured by flames. Over 17,000 buildings were destroyed. But the faith in its citizens in the future of Chicago, which had prevailed over financial disaster in 1837, was manifested in still greater degree in 1871, and was to accomplish the physical regeneration of the city. It has been the task and triumph of Chicago's builders, in less than forty years, to raise, as if by magic art, an imperial towering city of two and a half million people upon the ruins of its former self.

great fire to the present day, the phenomenal growth of Chicago has received no serious interruption. In 1870 Cook County contained about one seventh of the population of the state; in 1900 the proportion was nearly two fifths. In these thirty years the state outside Cook County gained only 36 per cent, but Chicago gained over 500 per cent.

Naturally, however, the extremely rapid growth and material development of Chicago brought with them unsettled conditions and friction—particularly friction between Capital and Labor. In 1886, the Anarchist riots startled the city and the whole country. In 1894, the year after the magnificent cele-



COURT HOUSE IN 1865, WHEN LINCOLN'S REMAINS LAY IN STATE THERE.

Original photo taken from south, showing procession entering south door.

Chicago Historical Society.



CITY HALL AND COUNTY BUILDING.
Razed to make room for present structure.

Chicago Historical Society.

bration of the triumph of the arts and sciences, Chicago, which had become the greatest railroad center in the world, became the focus of the tremendous railway strike of that year.

Many other industrial troubles have arisen in the growing, seething metropolis, but it is believed that the age of arbitration is practically here, and that Chicago will take the lead, as in other things, in providing wise means to bring about the speedy and just settlement of these disputes.

With the opening of the Drainage Canal, the vital problem of drainage for Chicago was finally solved. The Sanitary District of Chicago was organized under an act of the Legislature passed in 1889, in order to provide for the construction of a drainage canal, to carry the sewage of the city from Lake Michigan and the Chicago River down into the Illinois River. By 1900 this monumental work was completed at a cost of \$60,000,000, and once more the Lake and the waters of the Chicago basin found an outlet to the Mississippi. The canal has not only provided drainage for Chicago and saved further contamination of the Lake, whence the city draws its water supply, but it has completed the first link of another great project of immense importance to the future Chicago—a Deepwaterway from Lake Michigan to the Gulf.

We have seen how, in the early days of its history, the commerce of Chicago was stimulated by the opening of the comparatively insignificant Illinois and Michigan Canal; in like manner, the future of America's great inland metropolis, commanding the vantage point on the Great Lakes, is today indissolubly linked with the construction of a deep-water route which shall give free passage from the Lakes to the Mississippi, the Gulf, and the Panama Canal.

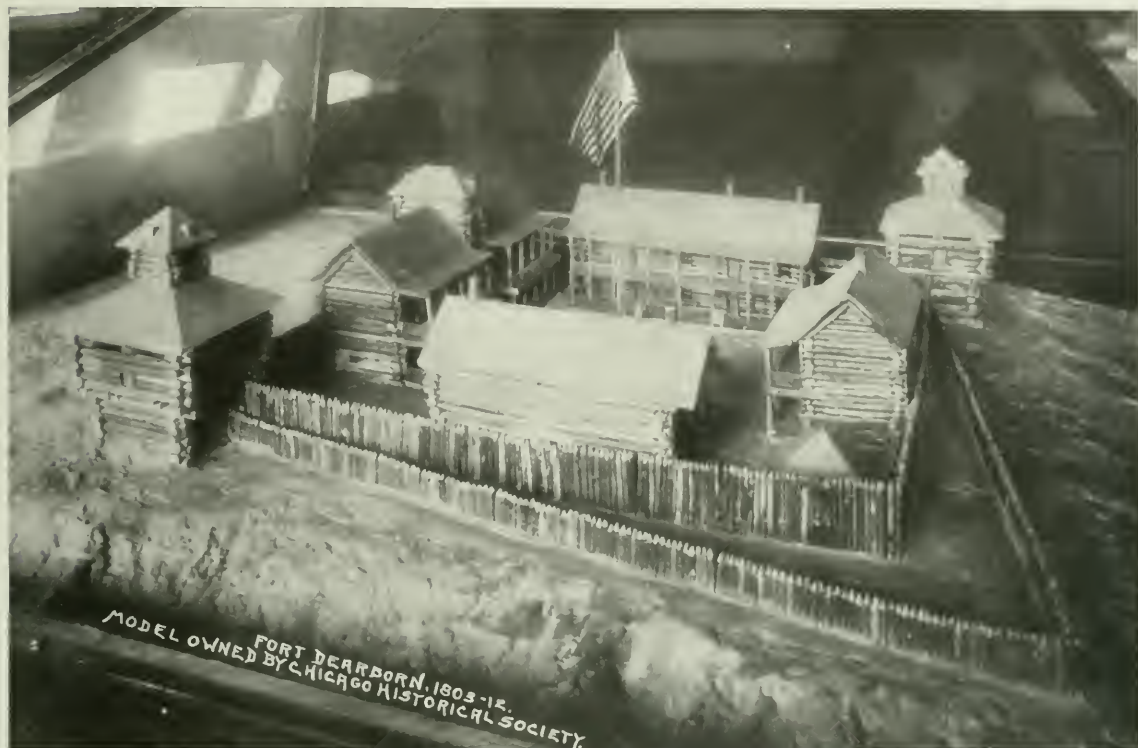
We have traced in brief outline the unprecedentedly rapid growth of the little trading post, organized as a village in 1833, into the present metropolis of the West, the fourth city of the World. The future of Chicago is hardly less secure than its past. The most conservative statisticians place the population of Chicago at between five and six millions in 1950.

The territory now embraced within the city limits has an area of 190.6 square miles, and extends twenty-six miles from North to South and fourteen and one-half miles from East to West at its widest point.

The harbor jurisdiction of the city extends three miles into the Lake along the entire water front. The geographical center of Chicago is near the intersection of Wood and 35th Street, and the center of population in the vicinity of 12th Street and Centre Avenue. The city now contains at least 2,250,000 persons, and nearly 300,000 dwellings. It has 4,227 miles of streets and alleys, 300 public schools, and 1,077 churches; there are 1,350 miles of surface and elevated roads, which carry a daily average of 1,354,000 passengers. The daily clearings of Chicago's banks are \$35,000,000, and manufactured goods to the value of nearly one billion dollars are produced annually in over 4,000 plants. The Union Stock Yards embrace five hundred acres of ground, in which are contained 25 miles of streets and 300 miles of track; 300,000 persons are directly or indirectly dependent upon the labor at the Yards. An average of 1,000 cars of stock are received daily, and the annual volume of business connected with the stock and packing industry is \$600,000,000. Chicago is the largest grain market, the largest lumber market, and the largest wholesale dry goods market in the world, but its aggregate business as a live stock market exceeds the total of these three.

The Mayor, who now holds office for four years, is the chief executive officer of the city of Chicago. He presides over the Council, and, with its consent, appoints the heads of nearly all the important city departments, including the General Superintendent of Police, the Fire Marshal, the Corporation Counsel, Commissioner of Public Works, Commissioner of Health, Building Commissioner, and numerous other officials. Aside from the Mayor, only the City Clerk and City Treasurer, among the city's executives, are elected. The legislative body for Chicago is the Common Council, composed of seventy aldermen, two from each of the thirty-five wards. The Act of the State Legislature, known as "The Cities and Villages Act," under which Chicago holds its charter, gives to the city certain enumerated powers, and, acting within these powers so granted, the Council passes ordinances for the regulation of the city's internal affairs.

The Cities and Villages Act also limits very strictly the taxing and borrowing power of all municipalities organized under its provisions. In the case of Chicago, where so many public improvements are



By permission Chicago Historical Society



CHICAGO, AS SEEN AFTER THE GREAT CONFLAGRATION
View north from Harrison Street.

From original photograph owned by Chicago Historical Society

essential to its full development and to enable it to keep pace with its unprecedented growth in population, these restrictions upon its power to raise money have been particularly felt. The modest limit of the city's borrowing power was long ago reached, and meanwhile permanent public improvements, such as new bridges, new police stations, and many other badly needed public works have remained unbuilt because the city was forbidden by law to pledge its credit further in order to raise the necessary funds for beginning their construction. The necessities of Chicago in this respect had become so apparent that the last legislature passed certain Acts which will enable the city by the issuance of bonds to borrow in all a further sum of about sixteen million dollars, or six millions less than the ordinary annual running expenses of the city. This power, however, is limited by a referendum act which requires the question of issuing any of these bonds to be first submitted to the people of the city for their approval.

By reason of Chicago's inability to provide funds for the purpose, public improvements in the past have not kept pace with the city's material growth and development. On the other hand, as pointed out in the Mayor's last annual message, the city of Chicago has come to its present proud position with the expenditure of less money, and with the creation of less debt in proportion to its area, population, and wealth, than any other large city in the country. The bonded debt of Chicago, which is less than \$29,000,000, is only about one third that of Philadelphia, and one quarter that of Boston. The city of New York pays annually as interest on its debt a sum practically equal to the bonded debt of Chicago.

In spite of its financial limitations, the city of Chicago under its present efficient administration, has found the means to provide adequately for the running expenses of the municipality, to pay its debts as they have fallen due, to begin the construction of a magnificent new City Hall to cost about \$5,000,000.00, and to provide other minor pressing improvements. The long vexed traction question has been settled and excellent transportation facilities provided, while the city is more than an equal partner in the financial returns therefrom. A special fund has been provided for street improvements, and a general tone of financial soundness is seen and felt

in all departments of the city government. The city is now able to borrow money at an exceedingly low rate of interest, and judgments against the city, for the first time in its history, are sold at par. A commission of experts in municipal affairs has recently been appointed by the Mayor to examine the whole field of the city's expenditures and make recommendations looking to economy along that line. The project for a great Chicago Harbor is receiving attention. Since 1889 the volume of shipping at the Chicago Harbor has been decreasing, while the volume at the Calumet has been growing. A special commission is making a careful study of Chicago's needs in the way of harbor and navigation facilities, with the view to the adoption of a definite course of action regarding this question by the city. A wise authorization to the city by the voters to use its credit, within the restrictions of the recent law, to raise money for needed permanent improvements will go far to make Chicago what destiny decreed it should be, the first city of the Western Hemisphere.

One of the pressing needs of Chicago is an increase in its park facilities. On becoming a city, Chicago chose as its motto "Urbs in Horto," although in 1839 the entire park system of Chicago consisted of a half square where the Public Library now stands. At various intervals a number of small parks were added, mainly through the public spirit of private citizens. In 1864 the City Council secured a portion of the land that came to be named Lincoln Park and appropriated \$10,000 for park improvement. In 1869 the movement for the connecting chain of parks surrounding the city started. This movement succeeded and Chicago soon became the second city in America in respect of park area. But the movement for parks stopped practically there, forty years ago, and the city is now seventh so far as park area is concerned, and, when relative density of population is considered, Chicago is thirty-second among American cities in its park facilities. There are here 590 persons for each acre of park space. The movement for parks has, however, again been started. State authority for certain park improvements has been granted, and it is not believed that Chicago, whose greatness has largely been founded in the public spirit of her citizens, will long lag behind in this important development.

The city was never more prosperous and flourishing than today. This is particularly manifest in the building line. Four of the largest and costliest private structures ever built in the city, involving an outlay of \$12,000,000.00, are at present under construction, while new ones are about to be commenced. In the year 1908 there were built within the city a total of 10,771 buildings, representing a value of over \$68,000,000.00 and an increase of more than 15 per cent over the preceding year. If the buildings constructed during 1908 were placed in one continuous row, they would present a solid frontage of 55.23 miles. For the first eight months of the present year, 1909, the figures are even more impressive. In those eight months building permits have been taken out representing a proposed outlay of over \$61,000,000.00, practically equalling the total of building operations during 1892, the year before the World's Fair. The total for 1909

should approach \$90,000,000.00, exceeding by many millions the total of building operations during any previous year in Chicago's history. Real Estate transfers for the same period show a correspondingly vigorous increase. By whatever standard it be measured, it is evident that the permanent substantial growth of Chicago is proceeding more rapidly than ever before, and the most enthusiastic predictions for its future are fast being realized.

Many constructive problems of vast magnitude still await solution—foremost among them, the opening of a waterway for the commerce of Chicago to the Mississippi and the Gulf of Mexico, and the solution of the local traffic problem through the construction of an adequate system of subways. To the solution of these great undertakings, however, Chicago, as ever in the past, will bring to bear the united support of its citizens and meet them in the spirit of its motto "I Will."



CITY HALL.



RESIDENCE OF MRS. POTTER PALMER,
1350 Lake Shore Drive.



RESIDENCE OF MRS. POTTER PALMER,
1350 Lake Shore Drive.





RESIDENCE OF MR. EUGENE M. KEELEY,
4954 Ellis Avenue.



RESIDENCE OF MR. FRANK D. STOUT,
4847 Ellis Avenue.



RESIDENCE OF DR. JOHN A. MCGILL,
4938 Drexel Boulevard.



RESIDENCE OF MRS. AUGUSTA LEIMANN,
2748 Lake View Avenue.



RESIDENCE OF MR. GEORGE E. ADAMS,
350 Belden Avenue.



RESIDENCE OF MRS. GEORGE M. PULLMAN,
1729 Prairie Avenue.



RESIDENCE OF MRS. MARGARETHA TRUE,
535 Wellington Avenue.

A RADICAL departure in apartment construction and one which marks a distinct advance in this character of improvement is the apartment being erected at No. 5825 Washington Avenue by Marshall & Fox for Mr. Frederick Bode.

The history of this apartment is rather interesting, inasmuch as it shows a broad minded business man's solution of the apartment house encroachment into a residence neighborhood. Mr. Bode, in order to protect the residence character of this block on Washington Avenue, entered into a combination with a number of other property owners to control 100 feet of vacant property on the east side of the street, adjoining on the north a residence occupied by himself. The death of the holder of one of the pieces of property in this vacant stretch threw the property into the market, and the association woke up to find an apartment building in the course of construction in the conserved district.

The die having been cast, Mr. Bode decided that the thing to do was to set an example in apartment construction which, instead of detracting from the value of the property, would materially add to and increase the attractiveness and beauty of the block.

With this end in view, he has constructed a three-story fireproof building, designed in the modern French Renaissance style, which in design, material and construction probably surpasses anything of the kind which has been attempted in Chicago.

Each floor is occupied by a single apartment of twelve rooms, an exposure of 114 feet of south frontage, with 50 feet frontage on the street. Each chamber is provided with a bath and equipped with all the modern conveniences of telephone, vacuum cleaners, etc. An automatic push-button elevator serves the various apartments. The apartments are arranged so that each is divided into three sections: The main or living portion of the apartment consists of living room, dining room, reception hall and entrance hall, occupying the west or street frontage portion of the building; the service portion of the house, consisting of pantries, servants' hall, servants' chambers, etc., occupying the north or court side; the chambers, four in number, occupy the south side of the building. Each of these sections is distinct and separate, being isolated from the remaining portion of the house; so that while each apartment is spread over a single level, all the privacy of a residence is afforded to its occupants.

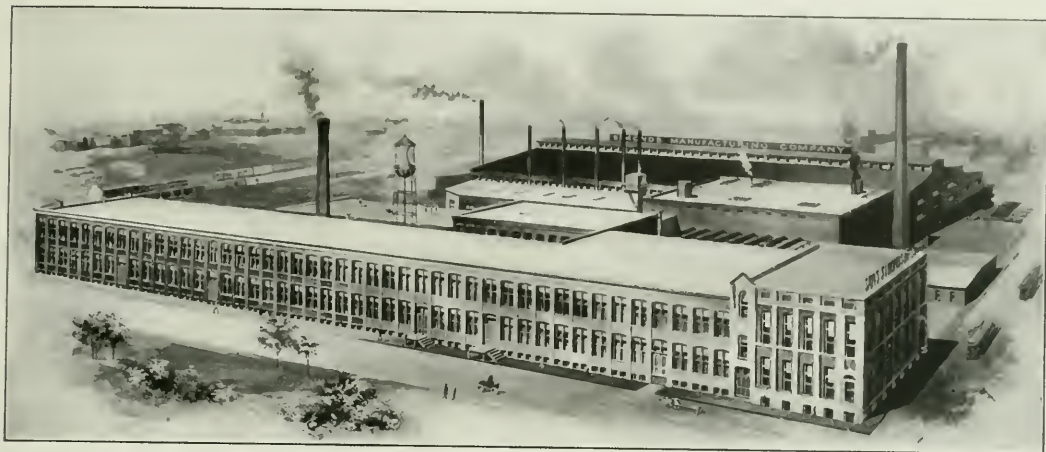
The facade of the building is finished in Bedford stone and red pressed brick, with slate-covered mansard, making a most attractive exterior. The entrance to the building is on the ground level, the entire first or ground floor being given over to janitor's apartments, storerooms, laundries, heating plant, etc., corresponding to the ordinary below-ground construction. By this arrangement the first apartment is located at a height of 10 feet above the sidewalk, giving a privacy which is entirely lacking in the first floor apartment when the standard Chicago arrangement of apartment building construction is followed.

This beautiful building will be ready for occupancy March 1st, 1910.

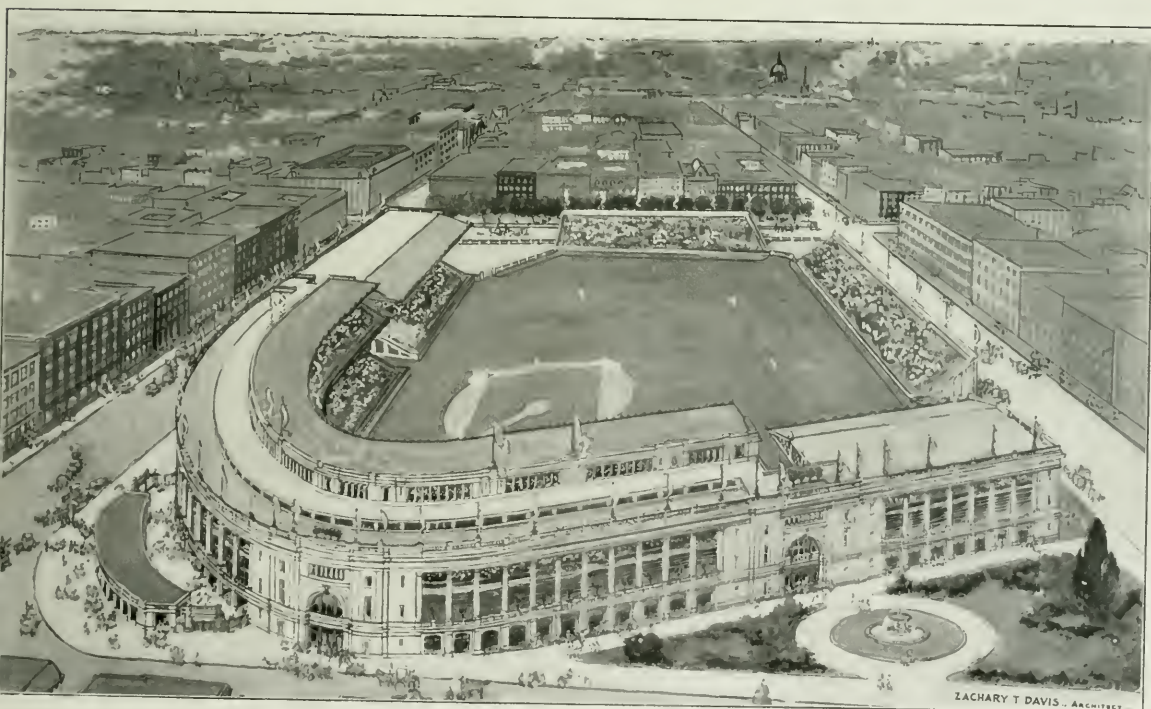


APARTMENT BUILDING OWNED BY FREDERICK BODE,
5825 Washington Avenue.

A HALF CENTURY OF CHICAGO BUILDING

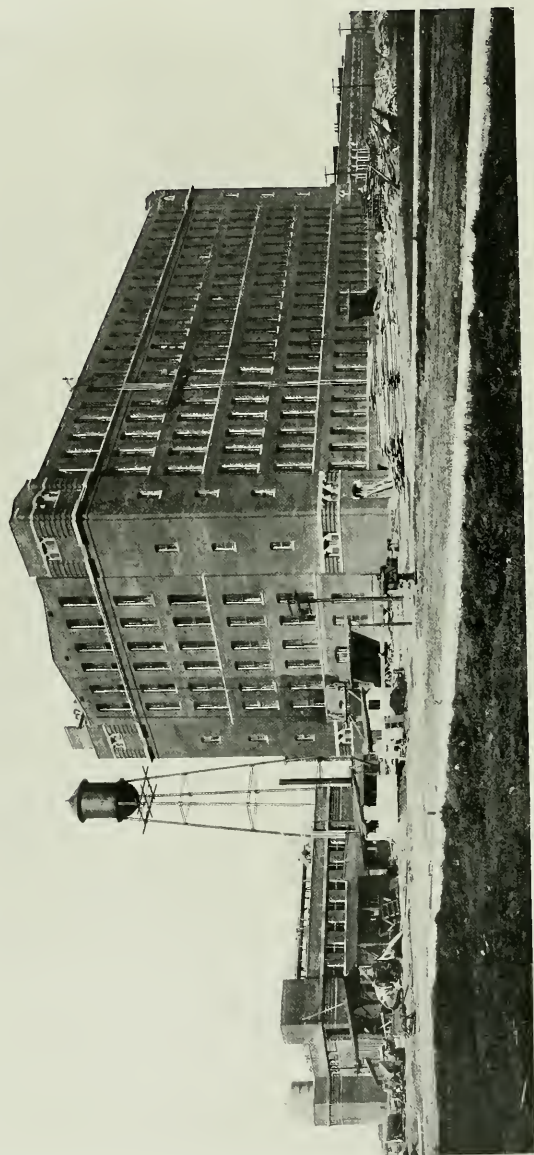


SIMMONS MFG. CO.'S SAW WORKS, KNIFE FACTORY AND CRUCIBLE STEEL PLANT, AT CHICAGO, ILL.



NEW HOME—CHICAGO "WHITE SOX" BASE BALL CLUB,
Thirty-fifth Street and Wentworth Avenue.

Chas. A. Comiskey, President.



SPAULDING & MERRICK TOBACCO FACTORY,
537 South Forty-third Avenue.



Chicago Stock Exchange Building

This building stands on the southwest corner of La Salle and Washington Streets on property 180 by 100 feet. The site is an historical one, as in 1837 on the corner was erected a large brick dwelling, said to be the first brick building constructed in Chicago and at that time the finest residence in the City. Subsequent to the fire of 1871, the Union Building, five stories and basement, was erected on the corner. In 1893 the new Chicago Stock Exchange Building was built, thirteen stories high, with 410 rooms, twelve stores, and two large Banking Rooms. This building is of steel construction, with terra cotta exterior, finished throughout in marble, mosaic, mahogany and oak. Ten elevators carry the 1,280 occupants to and from their offices. As the life of a modern steel constructed building has not yet been determined, under normal conditions the present building should continue its services for many years to come.

It is interesting to note that in 1836 the land on which the building stands was valued by the City Valuers at \$3,937.50. In 1908 the Board of Review valued the same ground at \$1,290,000. This shows an increase in value of the ground since 1836 of 32,700 per cent, or 448 per cent per annum, and is a convincing demonstration of the marvelous appreciation of Chicago Real Estate.



MARSHALL FIELD & CO.'S STORES (old and new)

D. H. Burnham & Co., Architects



SEARS,
ROEBUCK
AND
COMPANY

NIMMONS
and
FELLOWS
Architects





PLANT OF CHICAGO RAILWAY EQUIPMENT CO.
46th, ROBEY AND LINCOLN

Columbus Memorial Building

THE year 1892 was one of inspiration to the city of Chicago. The atmosphere was charged with the enthusiasm that conceived and constructed that marvel of beauty and art, the White City, or Columbian Exposition. Nor was it limited to the White City alone. A new era had set in. The materialism represented by brick and mortar at so much a cubic yard gave way to interpretations of architecture as art. Nowhere was this more excellently illustrated than in the Columbus Memorial Building, built and named in honor of the historic event then celebrated. Located at State and Washington Streets, it stands a monument to the public spirit of its projector, the genius of its architect, and the sincerity of its builders. It is one of the first of steel structures to rear its towering height fourteen stories skyward. The first two floors are of solid bronze, specially designed for this use, and are richly ornamented with bas-reliefs. The entrance to the building, two stories in height, is ornamented with a frieze of eleven panels, being pictures in bronze bas-relief of the life of Columbus, and above the entrance, extending through another story, is a niche containing the colossal statue of that historic character. Then, for twelve stories, specially designed brown terra cotta carry lines of great beauty to a roof of tile surmounted by an imposing tower. The tower is capped with a great globe to typify the round world of Columbus, and from the front cornice a colossal American Eagle, with out-stretched wings, ornaments and symbolizes the building. The corridor is entirely of rich Sienna marbles, built in columns, and with panels of mosaic containing the narrative of the principal events in the life of Columbus, and from this corridor a marble staircase and five elevators, surrounded by bronze grills, lead to the floors above. The floors and ceilings are of exquisite patterns of mosaic, of such delicate shades of colors that they seem more like oriental rugs. The lighting effect, with incandescent lamps in bronze fixtures, is a part of the decorative scheme. There is evidence everywhere of that co-operation of interest in constructive architecture, of that wise foresight in regard to real needs, that give the building an air

of having grown to perfection. The basement was set apart for safety deposit vaults. Rare marbles, beautiful furniture, and comfortable fittings were installed to make them attractive. There are sections set apart for men and for women. Divans, rugs, and other creature comforts make these vaults a Mecca for busy women, and many organizations constantly avail themselves of their hospitality. Marble and bronze statuary, real works of art, help to add the sense of luxury to comfort. There are twenty-five hundred safety deposit boxes, and any number of small private rooms, where one can undisturbedly attend to his own affairs. The ground floor is devoted to business purposes. The corner, a jewelry store, decorated and furnished by the projector of the building, is probably the most beautiful and extravagantly furnished of any in America. Its walls are mostly of marbles from the Pyrenees, in dove color, with ceilings and coves of mosaic in tones of blue, with gold bronze trimmings. Incandescent lamps set in festoons of gold bronze are set in these coves of mosaic, while columns of verde antique marble surrounded by electric lights and with pendants of Malachite, Lapis-lazula, and other semiprecious stones meet the eye. The furniture and fixtures are of heavy, rich mahogany, ornamented with gold bronze, all designed by the artist designing the interior decoration of the building, and in color and tone suited to set off the rich displays usually exhibited in fine jewelry establishments. The second and third stores, the former a confectionery shop, and the latter a children's outfitting establishment, are equally excellent in their appointments. The rear walls of these establishments are covered with two rare mosaic pictures by a master artist. The pictures were painted and done in mosaic in Italy, and assembled on these walls. They are life-sized human figures representing Columbus' discovery of America and the raising of the Spanish standard, and his return with gifts and friendly Indians to the court of Ferdinand and Isabella of Spain. The colors are rich and beautiful, and being of mosaic are perpetual memorials rarely or never used as a commercial asset, and fit ultimately to find their



Columbus Memorial Building
COLUMBUS SAFE DEPOSIT CO.

way in some public or national museum. A constant stream of people pays homage to these works of art. Mounting the marble staircases for a leisurely examination of details, one is struck by the fact that everywhere the corridors are of marble, the floors and ceilings are of mosaic, and what little wood-work on doors and jambs is of the finest of mahogany. The second, third, fourth and fifth floors are devoted to commercial pursuits. From the sixth up, the medical profession fairly monopolize the space, and a splendid room on the fourteenth floor is devoted to a

medical library and reading room. The appointments throughout are perfectly conceived and executed, and the standard set has been many times imitated in the last sixteen years, but never excelled. In the rush of business and because it is a commercial building, the merits of the Columbus Memorial Building may be overlooked, but it will richly repay anyone who is at all interested in the subject to devote himself, without stint, to exploring its nooks and corners from the medallions on the outside columns to the tracery of the roof. The result will be joy.



CHICAGO PLANT OF THE NATIONAL MALLEABLE CASTINGS CO.,
Twenty-sixth and Rockwell Streets.

Problem of Traffic Congestion

and J. Madison Pace's Relief Plan by Boulevard Connection Between the North and South Sides

Proposed July 11th, 1908, by

J. MADISON PACE,
Real Estate Appraiser, Chicago, Ill.

WM. H. PRUYN, JR.
Architect, Chicago, Ill.

IT is stated from careful estimates based upon actual count that there are over 237 pedestrians and 102 vehicles traversing the streets in the limited space between Randolph Street and Rush Street bridge on Michigan Avenue and its intersecting streets, every minute of the day between the hours of 7:00 A. M. and 6:00 P. M.

It is almost beyond comprehension how the residents of the North Side could have tolerated so great an inconvenience for more than 25 years.

The suffering from the hiatus—the rough and hideous blank that exists between the North and South Side Boulevards is by no means confined to the North Side Residents; it is borne by a great majority of the business people in communicating with their places of business.

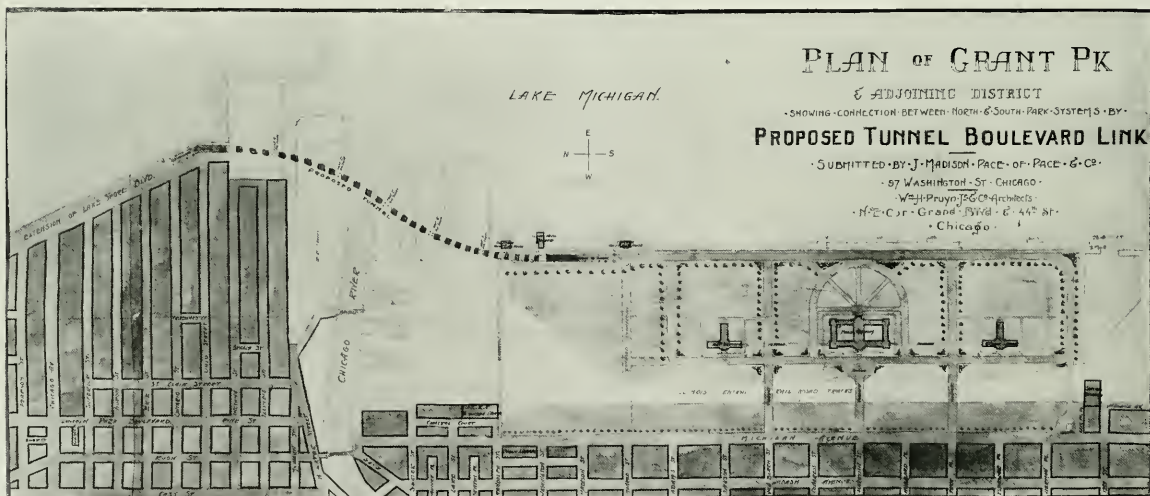
All Chicago agree that some plan for a Connecting Boulevard, should be developed and executed; what the people demand is an adequate uninterrupted means of communication that can be expeditiously

executed at the least possible cost to the Citizens of our Great Metropolis. It therefore behooves us to bring before you a possible and expedient measure of relief.

Look at the picture of Grant Park, and the Lake Front Parkway, as shown opposite, with their attractive and practical connections with Michigan Avenue, by artistically designed viaducts over the Illinois Central Railroad Tracks (which railroad we hope will be electrified in the near future) at 12th Street, Peck Court, Harrison, Van Buren, Monroe and Randolph Streets, in order to fix clearly in your mind the relation as embodied in the plan, which presents one of the most magnificent highways in the world.

Outlet for Grant Park

Note particularly also, that the design here shown furnishes an inexpugnable, permanent, simple, economical and highly efficient connection between the



North and South Park Systems, possesses innumerable artistic possibilities with its practical utility pre-eminent, and secures results for the people without legal delays, or needless procrastination.

You will also see that without the connection as shown in this plan; Grant Park entirely excluded from Park Boulevard Systems, and the attractive and expensive (Ohio Street) Lake Shore Drive extension of the Lincoln Park Boulevard Systems is left inaccessible and without an outlet to the South.

The plan provides an adequate front door to Lincoln and Grant Parks and eliminates entirely the infelicitous hinderance of light traffic which now so commonly occurs by open bridges and traffic congestion in the vicinity of Rush Street Bridge.

Chicago's Best Opportunity

This plan opens up and develops a permanent and much needed public improvement which has for many years past been neglected and is the most practical, economical and feasible opportunity that Chicago possesses for this purpose.

Two Thirty Foot Driveways

The design contemplates a double tunnel 76 feet in width, commencing a little south of Randolph Street, and receding northward at a grade of 2 per cent and emerging on Lake Shore Drive near Ohio Street on the North Side at a like grade, each bore to contain a separate driveway of 30 feet each in width and 20 feet in height, with a 6 foot sidewalk for the accommodation of pedestrians. The two bores to be connected by a series of arches between them, separated by piers 4 feet in diameter.

Reinforced Concrete Construction

In the construction of the boulevard as shown the author recommends the use of reinforced concrete as structural material, and white glazed terra cotta for lining and finishing; and cresote blocks for paving driveways.

Perfect Lighting System

The lighting as planned throughout will be after the style of the Reverse Lighting System, composed of numerous clusters of electric lights artistically arranged throughout the driveways so as to throw the light toward the ceiling, which will act as a reflector, thus giving a diffused effect. This will also be re-

inforced with large light shafts situated 300 feet apart and lined with white glazed terra cotta, thereby giving an abundance of light and ventilation and making the bore absolutely sanitary.

The plan also contemplates a railing between the driveway and sidewalks and between the piers separating the driveways throughout the tunnel boulevard, and around the approaches at the grade level, all of white glazed terra cotta with balustrade effect. A grade of less than 2 per cent is made possible by reason of the unobstructed route.

Architecturally Beautiful

The architectural problem is so thoroughly and satisfactorily worked out that it makes the tunnel absolutely sanitary and gives proper light and ventilation, and so attractively ornaments the interior that it will make the traversing of the bore safe and pleasant. Continuous traffic would not be interfered with as in the case of a bascule bridge.

No Condemnation Necessary

Note particularly that the plan as shown here does not require the condemnation of valuable property, as is necessary for the completion of other plans heretofore submitted.

It does not obstruct the proposed widening and deepening of the Chicago River, but is in line with such an improvement as the roof of the bore is 40 feet below the surface and the airshafts are so arranged that the river could be widened to a width of 250 feet and a depth of 40 feet, should the future developments demand it.

Freight Traffic Increasing

The Boulevard will not retard traffic en route to the proposed outer harbor system, but is the only plan yet submitted that eliminates the congestion of pleasure traffic at the cross streets connecting with the Lake Front, thus leaving the East and West Streets clear for so called, heavy teaming.

It does not obstruct the street crossing between the loop district and the railroad freight houses, the docks and large ware and storage houses. To the careful student of industrial conditions it is clear that heavy teaming can not be dispensed with on any of the East and West Streets between Randolph and Ohio Streets or at the crossings of the East and West

Streets on Michigan Avenue or Pine Street, with the factory district developing on the North Side, and the immense railroad terminals with more than 100 acres of freight cars, both east of Michigan Avenue, and these conditions being permanent ones, with a healthy increase in traffic, and the rapid building up of Michigan Avenue, with office buildings, clubs, hotels, retail stores, public institutions, etc., renders the Grant Park and Ohio Street connection a most possible and practical plan of relief.

It is closely estimated that over 2,500,000 tons of freight in and out bound, are handled at these freight houses east of Michigan Avenue annually. At two tons per wagon would mean 1,250,000 loads, most of which must cross Michigan Avenue. In addition to the immense traffic in this vicinity it is closely estimated that there are 3,500,000 so called pleasure and light business vehicles, that traverse Michigan Avenue and its intersecting streets between Randolph and Kinzie Streets; 80 per cent of which could conveniently and profitably use the tunnel boulevard shown here, thereby relieving the congestion on Michigan Avenue to a very large degree. The extra distance caused by the deflection of traffic to the East would be more than offset by the ease and speed with which the business district could be reached by the North Siders.

Anyone engaged in lake traffic, and located some distance up the Chicago River will readily appreciate the importance of dispensing with bridges as far as possible and the development of subway connections between the North, South, East and West Sides.

Cost Less Than Other Plans

The construction of this Boulevard if adopted can be commenced at once and rushed to completion without condemnation suits (which would necessarily take place in the carrying out of any other plan yet submitted to the Board of Local Improvements). This is the only plan that is in strict harmony with the improvement of Grant Park, the proposed Passenger and Freight Subway, and with the future Outer Harbor, River and Deep Waterway Development. By the addition of large conduits on the west side of the bore, (which could be used for telephone, electric light, cables also water mains) would no doubt earn a sufficient revenue to meet the charges

of maintenance. It stands last but not least, hand in hand, with the making of a Greater Chicago.

Surface Boulevard Connection

The Author of the Tunnel Boulevard, also has under consideration two other possible relief plans of which space here would not permit the printing of sketches.

First the connection of Michigan Avenue with Pine Street by the construction of single decked bridge with a 240 foot span (either bascule or lift type) diagonally from the end of Michigan Avenue at its present width (Plus the accretion attainable by narrowing the sidewalks on each side of Michigan Avenue sufficient to give a 40 foot driveway) north-easterly to connect with the south end of Pine Street extended at its present width. The grades and other engineering details to be worked out in accordance with the engineer's requirements.

Rush Street Bridge Remains

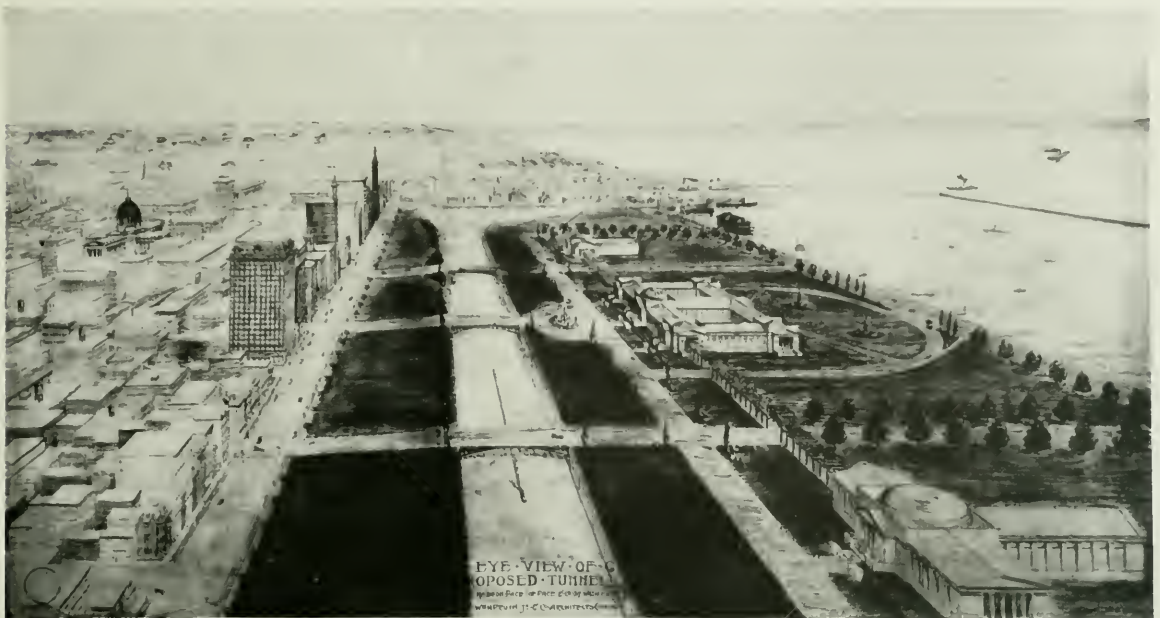
Rush Street Bridge is to be left as it is for heavy traffic as the new bridge will not in any way interfere with its operation.

Condemnation Cost Small

Taxpayers will be relieved of the enormous cost of condemnation of property and the unwarranted delay that would necessarily follow any of the other plans. This plan contemplates an inexpensive connection, the total cost will not exceed \$750,000, as there is no condemnation of property, (except a small piece of property joining the River). Michigan Avenue and Pine Street can be boulevarded so as to get a forty foot driveway without any expense whatsoever, (with the exception of paving) to the taxpayers. By the adoption of this plan, work can be commenced at once. The result will be the rehabilitation of an old shabby quarter of the city, thereby, resulting in the conversion of the street to retail uses and accruing great benefit at a minimum expense to the people at large.

Grant Park Surface Connection

The other plan not illustrated here is a surface boulevard, connecting Grant Park with the new Extension of Lake Shore Drive at Ohio Street, via the same route as proposed for the tunnel connection.



BIRDSEYE VIEW OF GRANT PARK AND PROPOSED TUNNEL.



ENTRANCE TO PROPOSED TUNNEL.

This connection can be accomplished at about the same expense as the proposed tunnel boulevard as shown in the picture.

We give preference, however, to the Tunnel Connection, which we believe will provide for the people that which they are continually demanding, "An uninterrupted connection at a minimum expense."

We respectfully submit that it is conceded by the Commercial Club Plan Committee, the Michigan Avenue Improvement Association, and a great many property owners and business people, that a connecting Boulevard at the Lake Front, connecting Grant Park with Lake Shore Drive Extension on the North Side is inevitable.

Confusion of True Basis of Land Values

By EDGAR M. SNOW

A COMMON error is made by confusing the value of land with the value of the landlord's estate in land. Thus, conveyances of reversions carrying with them ground rents are frequently referred to as establishing a present market value of the land. This is a mistake. Such transactions simply show the value of the landlord's estate in the land thus conveyed.

For example, a conveyance was made some time since, at \$125,000, of 105½ x 171 feet in Michigan Avenue, 38 feet north of Jackson Boulevard, subject to a long term ground lease, made years ago, at a fixed annual rental which, on the basis of present value, is too low. This transaction did not mean that land at that point was worth less than \$1,200 a foot at that time, as indicated by this transfer—it was, in fact, worth several thousand dollars a foot,—but it meant merely that \$1,200 a foot was the value of the landlord's estate in the land, incumbered by such lease, and ascertained by capitalizing the yearly ground rental upon a percentage basis satisfactory to the investor, and acceptable to the seller.

On the other hand, it is sometimes found that land is leased for a long term of years, upon a basis considerably in excess of its present value, but because the lessee of the land has erected thereon valuable buildings, affording an abundant security for the ground rent, the owner of this "fee" (that is, this land and the lease) is able to find a purchaser at a price determined upon the basis of the ground

rental. This price, thus secured, is not the value of the land, but is the value of the land and the lease, and is in excess of the value of the land alone, and affords no proper criterion thereof. It is merely the value of the landlord's estate in the land and the lease. Nor, in fact, does the landlord's title to the land itself without the lease—that is, the probable value of the land at the end of the lease—cut much figure in a transaction where the ground lease has, say, fifty years or more to run. It is really the secured lease which is the landlord's asset. Without the ground rent, the present value of such land alone, (that is, the reversion, the possession of it at the end of 99 years) is merely a nominal speculative sum.

The difference between the value of the landlord's estate in a "fee" and the true, or market, value of such land is represented by a profit or loss, as the case may be, to the lessee of the land. Certainly no appraiser, asked to give the value of land, considers that this means other than its market value upon a free and clear basis, and this only is the true value.

There can obviously be no such thing as various values at the same time for adjoining land of equal desirability. Hence, to quote "ground rent" transactions as proper criterions of actual values of land, is clearly wrong, as it is apparent that the market value of land may be in excess of, or may be below, that shown by the sale of a "ground rent."

Taxation

By FRANK G. HOYNE

OCTOBER 9th, 1871, the Great Chicago Fire laid in waste the entire business district and the territory from Harrison Street on the South to Lincoln Park on the North. Chicago in ruins, property gone, insurance companies bankrupt, left with nothing but that unquenchable spirit I WILL burnt upon her virgin breast. Had Chicago citizens not been possessed of that spirit I WILL, Chicago would not have risen from its ashes and become the Great Metropolis she is today. With this same spirit she overcame the panic of 1873 and was able in 1893 to bring to her shores that glorious Exposition which has never been equalled and in my opinion never will be equalled, and for all ages will be known as the WORLD'S FAIR. Chicago's growth and progress has been phenomenal and has today the smallest bond issue outstanding of any of the large cities of this country. And do you know why Chicago has such a small bond issue? It is because Chicago citizens know what a mortgage the paying of interest and providing a sinking fund means. After the fire of 1871 the owners of property with practically no insurance money to rebuild were obliged to mortgage their holdings to put their property in shape to earn incomes and it is not so very long ago that these mortgages and debts were liquidated and their properties cleared. You can not convince an old Chicago citizen that he is in a better financial condition with a mortgage upon his property than he would be without the incumbrance, or that a city is more prosperous because of a large bond issue. America is the greatest country on the face of the globe not because she has the largest national debt, but because she has the smallest national debt. Bond issues are a drain upon the income of an individual as well as upon the revenue of a municipality. I am decidedly opposed to shifting upon the next generation an indebtedness you had not the courage or honesty to meet. I call it contemptible and cowardly; pay your bills as you go; if you have not the money on hand for pressing needs, get it in hand before you spend it; keep your City in repair by revenue only and impress upon the

officials whose duty it is to provide and collect revenue that they secure all the revenue the law contemplates and from the sources you know to be equitable and fair. My theory is, a city should as carefully avoid bond issues as an individual endeavors to avoid mortgaging his holdings; revenue and income is what a city and the individual needs, not bond issues (a la Yerkes) to eat into and reduce net incomes.

The Chicago citizen, generally speaking, is practical and upon most propositions he votes wisely and well. The citizens of Chicago have overcome many obstacles; the City is gradually but surely growing better every year. There are many reforms and improvements yet to be made and I am optimistic enough to believe that they will be made. Our method of taxation is constantly improving and if politics could only be *eliminated* when this question is being considered it would make much *faster* strides forward. Still we have made some little headway, for Chicago has outlived and overcome the vicious system of Town assessment boards and is now trying to improve upon her improved system of taxation. Taxation is a necessary evil and has been such from the first formation of recognized governmental organization. The great problem is and always has been how can this evil be best regulated and made least burdensome and most equitable. Unjust taxation and the rapacious greed and methods of tax gatherers was one of the principal causes of the downfall of the Roman Empire, the same causes brought about the American Revolution. In every country and at all times it has been the cause of much turmoil, violent uprisings and has brought ruin and destruction to whole communities. A just tax would be hard to prescribe and to levy and collect such a tax during the present generation would be almost the impossible.

An absolutely fair tariff act (and I have had practical experience in administering the law under four different acts) has never been placed upon the statute books and in my opinion never will be. A revenue system for our local government equitable and satisfactory to all interests has not yet been found,

for in all communities it has been opposed by the spirit of aggression, oppression, self-interest and injustice. Marcus Licinius Crassus, the great friend of Caesar and the wealthiest Roman of his day, Plutarch tells us accumulated the greater part of his fortune from war and fines, making public misfortunes the source of his wealth. "Observing the accidents that were indigenous and familiar at Roman conflagrations and tumbling down of houses owing to their weight and crowded state, he bought slaves who were architects and builders. Having got these slaves to the number of more than five hundred it was his practice to buy up houses on fire, for the owner owing to fear and uncertainty would sell them at a low price, the slaves would set to work and extinguish the fire and Crassus at small cost would repair the damage, and thus the greatest part of Rome fell into the hands of Crassus."

I am sorry to say that the spirit of Crassus is not entirely extinct today. If he were alive he would be one of the many asking that taxes be assessed upon the amount he paid the owner of the burning buildings. While this character of citizen still exists who seeks to escape paying his just share of governmental cost, I sincerely believe it to be true that the great majority of objections made is not because of the tax nor the amount but because the individual thinks his share proportionally is greater than his neighbor. I am sure the large majority of our citizens are willing to pay their share of the taxes to maintain our City, but with some justice do they rebel against paying \$200.00 when their neighbor with probably double the value and more elegant furnishings is taxed but \$100.00. How can the Board of Assessors equalize the assessment throughout Chicago unless some plan is adopted for comparison of all assessments which is not possible under the present system and within the time taken to make assessments? Under the present custom the Board of Review can give but slight consideration to the whole assessment and the inequalities still remain. As the late Mr. Galloway truly said, as now conducted the Assessors and Board of Review are like football teams, kept on the rush for a short season and then laid off for the next year. The Assessors rush the ball one way and the Reviewers the other, neither giving heed to the other while the great body of taxpayers stand on the side lines yelling and gen-

erally ignorant of the rules of the game though they pay the bills.

Still with this great handicap and even under this old habit of rushing the assessment each year and the wear and tear upon the grey matter of the members of the Board of Review we have progressed. The increase in assessed value of personal property since the passage of the Juul law in 1898 from thirty millions to one hundred millions shows that we have made headway and I would like to ask the opponents of the personal property tax what system can they advocate to take its place and produce a like revenue. If the advance we have made can be done under this rushing process, what an advance could be made if it was discontinued; the law was designed expressly to avoid this trouble; why not follow the intent of the law?

To bring about a fair assessment of realty is a difficult proposition and to search out the amount of personal property which should be assessed and then fairly assess it under our present system is much more difficult, but the greatest difficulty of all is to suggest a remedy that will cure and there are as many different prescriptions for our ills as there are M. D.'s in the community.

In lieu of a personal property tax the "habitation tax" certainly has some merit. This tax suggested by Professor Taussig of Harvard University to the Massachusetts Tax Commission, provided for the levying of a tax on all persons occupying dwellings of an annual rental of more than \$400, at the rate of ten per cent on the excess of rental value over that sum. The act of the Province of Ontario providing for a "business assessment" of 25 to 75 per cent on the value of the property occupied or used for business purposes, such assessment to be computed by reference to the assessed value of the land so occupied. This is irrespective of any assessment of land; this also has some strong features, and recommendation, but in both of these methods the correct rentals and honest values must be ascertained and the question is here as with our method, will the law be conscientiously carried out and will honest values be returned and made.

I am sure that every one will admit that the basis of a fair and equal assessment must be the correct and complete listing of property subject to taxation. Under our present system more or less prop-

erty escapes taxation; although the law requires the scheduling of personal property, the law is not enforced as the only penalty of disobeying the law is an increased assessment, a small penalty and not carried out to any great extent. In my opinion every resident should be required to furnish the Assessors with a complete list of all his property, personal and real. Failure to file such a list should be punished by a heavy fine or some other more stringent method used to compel the filing of a complete list of all taxable property. If this could be brought about and all the personal and real property of the residents of Chicago were properly listed and taxed and the City received only its share and a fair compensation from the companies enjoying or asking franchises from the City, and the Legislature brought to see the injustice of exempting from taxation by the City of Chicago of all the valuable railroad terminals within the City, or in other words to give Chicago what properly and fairly belongs to her, the amount of revenue would be increased to such an extent that there could be no cry for an increased bond issue and lack of revenue, but instead the City would be so overburdened with riches that every street and alley could be paved with the most extravagant pavement at the City's expense and special assessments abolished. Even under the present mode and this year's assessments, Chicago should be, can be and I am sure will be made a City beautiful.

Now in closing I will say I heartily endorse Prof. Merriam's suggestion for a Central Body of Control to insure unity of action in regard to revenue and expenditure but I think you will agree with me, admitting our laws are not perfect and in many ways can be improved, still the fault does not wholly lie there but also to a large extent with a spirit uppermost in many minds to evade or overcome the real meaning and intent of our laws and I will say further that no greater work can be done than to preach strict observance of the law and then be sure to practice what you preach.

The first suggestion I think on record by any man for the establishment in each of our collegiate institutions of a professorship to occupy a chair of integrity for the teaching of that ancient and important accomplishment HONESTY, was contained in an address by the late Hon. Wm. B. Ogden, an old and respected citizen of Chicago before the Trustees of the Old Chicago University. I know of no such chair in any of our present day colleges and I heartily second his suggestion. Such a professorship might be able to impress upon the rising generation, using some of the recent exposures in the Insurance world and other lines, that no matter what walk of life a young man may choose to follow, that honesty, pure and unadulterated, is the only SAFE and sure principle to follow if he anticipates to pass the closing years of his life in a SAFE and contented manner and free from all regrets.

Subdivisions and Their Development

HENRY G. ZANDER of Koester & Zander

THE subdivision is the first step in the expansion of the city. From the time when the first plat of our city was filed, until the present day, the subdivider has been the pioneer in its expansion, buying the vacant area on the outskirts of the growing city and developing same according to the demand of the growing population and not infrequently far beyond the immediate necessity.

The first Chicago subdivision (Kinzie's Addition) was filed for record February 22, 1833, over

four years before the map of the "Town of Chicago" was filed on May 30, 1837. The canal commissioners were authorized to lay out subdivisions in canal lands in 1829, and either in the fall of that year or in the spring of 1830 the original town was platted. The earliest sale of lots was in 1830 but it was not until 1837 that the plat was recorded. In the meantime three subdivisions or additions had been laid out—Kinzie's in 1833, Russell, Mather & Roberts' was filed on January 22, 1835 and Wolcott's on

July 2, 1835. The official record therefore shows the subdivider to have preceded even the official platting of the original town.

The development of the city may well be traced by the recorded history of its subdivisions. The carefully planned residence district of a few years ago is the business or factory section of today. The spirit of progress has driven the residences further and further from the center of the city, giving the subdivider full opportunity for the display of his ingenuity. The treeless prairie, sand hills and swamps surrounding original Chicago had very little of natural beauty. The homey park-like appearance had to be created from a barren waste.

To the credit of the early subdivider be it said that his first thought was trees, and this is true to the present day. The nursery man nearly invariably follows the surveyor. When it is decided that the farm is ready to be turned into a subdivision and the preliminary steps of determining width of streets and alleys, size and frontage of lots, have been completed; trees and shrubs are set out and the plowed fields sowed in grass. Streets are graded, side-walks laid and in very many instances all of the underground work, such as sewer, water and gas mains, are laid, "stubbed" into the lots and the streets paved. Experience has taught the subdivider to safeguard his interests by prescribing building lines and in many instances restricting the occupancy, in fact very few subdivisions are filed today without restrictions of some kind. In recent years the subdivider has sought to establish the character of the neighborhood by erecting the first buildings, and conveying the vacant only upon conditions prescribing the cost and nature of the improvements.

Subdivision building is divided into two classes, that which is done with the view of developing the land and that which is done with the view of profit on the building only.

The larger operator in subdivisions today confines himself mainly to building with the view of developing the land, and makes his profit out of the enhanced value of the remaining vacant. This plan is feasible only with a tract of considerable size, preferably in an undeveloped district where the establishment of desirable surroundings, will not only make the subdivision easily marketable but largely enhance its value. There have been many pronounced successes in this line of work and more failures. In building a house for sale a number of things must be taken into consideration. First an attractive exterior is absolutely necessary. The interior must be so arranged as to suit the greatest number of people. While it is important that the builder and architect work as much of their individuality as possible into each building, great care is necessary to avoid anything bordering upon the eccentric.

If an interior is worked out that seems to meet the requirements of the greatest number of people in the locality being developed, great care must be taken to avoid duplication of exterior design and this is by no means an easy matter. It does not require a building expert to pick out the work of the same architect in a row of houses. No matter how competent he may be or how different his plans look upon paper, there is a similarity in little things which must be avoided. For that reason several architects are employed to design exteriors, which confine them to the same general floor plan.

Articles in magazines and newspapers, "plan-books," sold at a moderate price, and particularly the opportunity to examine a great many buildings offered for sale, has made the average home seeker an excellent judge. He or she, and generally the wife is the best posted, have learned of the pitfalls of poor construction. They inquire and examine closely and woe to the continued prosperity of the builder who attempts to cover up, with paint or fresco, defective or shoddy construction.



Deals Halted by Taxes

By EDGAR M. SNOW

IN the multiplicity of details that constitute the various elements in real estate transactions, no one item, other than the price, contributes to the upsetting of real estate sales so much as the matter of taxes.

The usual procedure is to leave this important matter unadjusted until the last moment, after weeks, or perhaps months, have been spent by the buyer and seller in getting together upon the other features of the transaction.

This is due, perhaps, to the thought of each that the other will not let "the little matter of taxes" break the deal, after all other matters have been understood and agreed to, or perhaps it is because each, being in doubt as to how to approach the matter, in the absence of a correct understanding of the subject, procrastinates until a time when the subject must be met.

Taxes become a lien upon the first day of April. They are assessed in June, and are acted upon by the board of review in September, and by the board of equalization at Springfield in October. The collector's books are then made up in November and December and are turned over to the county collector in December or January, and taxes may be paid without penalty to May 1 following, but become in default from May 1, and are advertised in May or June, and judgment thereon is taken in the county court in July. The tax sale commences thirty days after judgment, which is around August 15, and the tax sale continues until all the property delinquent is disposed of—either sold or forfeited.

Now, the occasion of the disagreement which the matter of taxes causes is more particularly because there is no uniformity of understanding as to the period for which any year's taxes apply, and there is, perhaps, no specific law fixing it.

Many persons suppose that they apply from May 1 of the year in which they are assessed to May 1 of the following year; first, for the reason that until a comparatively recent date taxes became a lien upon May 1; and, second, because they may be paid without penalty until May 1 the following year; and,

third, because leases more generally run from May to May.

Others suppose that taxes apply from April 1 to April 1 on the theory that April 1 is the date upon which taxes become a lien.

But the consensus of opinion among lawyers and and real estate men is that taxes apply from Jan. 1 of the year in which they become a lien, to Jan. 1 of the following year.

It is to this confusion as to what period taxes apply that the difficulty exists in getting buyer and seller together on the matter of taxes.

Generally speaking, it might be said to be the custom that if a sale is negotiated earlier in the year than July 1, the purchaser assumes the general taxes for that year, but even prior to that date, it is frequently difficult or impossible to induce buyers to do so.

After July 1, and for a period of perhaps three months thereafter, buyers usually urge that the seller shall pay all the way from one-half the taxes to all the taxes for the year, and after Oct. 1 buyers are disposed to insist that the seller shall pay the whole tax for the year, though this latter is by no means always conceded by the seller.

Such, in a general way, might be said to be the practice, though the experience and observation of different brokers may vary some in this regard.

If it were universally conceded that the taxes of any given year apply from January to January, it would appear that little difficulty would be experienced to establish a custom that the seller shall pay the taxes for that proportion of the year during which he receives the income from the property, and that the purchaser shall pay for the remainder of the year.

In the absence of this definite understanding as to just what period taxes apply, and with the various contentions that they apply from January, April, or May, sellers making a sale prior, for example, to July 1, often contend either that the purchaser shall assume the taxes for the whole year, or, in any event, that the seller should be called upon to pay the taxes for but two or three months, depending upon the

seller's notion as to whether taxes apply from April 1 or May 1. The purchaser, claiming, perhaps, that they apply from Jan. 1, demands that the seller pay for six months.

In the case of vacant property the seller should pay the taxes for that proportion of the year that applies prior to the date of the contract of sale—that is, from the date the bargain is made—and the purchaser the proportion of the year thereafter.

The difficulty in having adjudicated how taxes apply is, perhaps, in part due to the fact that the fiscal year of the different taxing bodies whose levies go to make up the total taxes is from different dates, whereas the fiscal year of all taxing bodies should be uniform and correspond to the calendar year. This lack of uniformity of dates of the various taxing bodies is one of the many arguments in favor of their consolidation.

The Relation of Insurance to Substantial Building

By HERBERT DARLINGTON

NOWHERE is the relative value of an ounce of prevention greater than in the precautions taken to protect our modern buildings and their contents from the ever-present danger of destruction by fire; and it is an essential function of a properly equipped insurance office to co-operate with property owners and their representatives to this end. The average life of a Chicago building can no longer be estimated at twenty years; but we cannot build for permanency unless we safeguard our structures against the most destructive of the elements.

And nowhere is the high class of trained expert advice available without expense as in the matter of fire protection. The evolution of modern industrial activities requires the constant adaptation of buildings to conditions forever changing; new processes are being introduced, new hazards are created, and new safety devices are brought forward daily. The Underwriters' Laboratories maintain a paid force to investigate these hazards and these devices, and thoroughness and impartiality give scientific value to their conclusions. No architect and no underwriter, personally, can always keep abreast of the very latest knowledge, during the present period of substantial progress in so many of these lines; but a modern insurance office, if properly equipped for its ultimate purpose, will have experts in the different branches, and be able to give every possible assistance to builders, to the end that our modern structures shall be as

free from the danger of fire as human foresight can provide; and be ready to promote and encourage every device for safety, to the end that the cost of indemnity shall be as small a tax on the community as the financial permanency of the Insurance Companies will warrant. The wise are always alert to learn from any source, and the competent architect of today is not deterred by a misplaced professional pride from availing himself of the valuable assistance of the Underwriter, whose practical experience in his own broad field is at his service, gratuitously.

The theory, once boldly announced, that the underwriter should charge for the hazard as he finds it, that he has no responsibility for dangerous conditions—no concern about the conservation of this important part of the wealth of the country—is as shocking today as would be a parallel claim by the medical profession, that they should deal only with cures, and not interest themselves in causes and prevention of disease. Like the physician, the underwriter owes a duty to his country and to humanity which he cannot avoid, and which he does not seek to evade.

The frank co-operation between the architect and the underwriter, which is such a gratifying feature of present construction work, affords grounds for sincere faith that the Chicago of the future will be not only the City Beautiful, but also the Beautiful City Permanent.

Libraries and Museums

By NORMAND S. PATTON

IN the development of a new community, the founding of libraries and museums is not to be expected in the early years, and the erection of suitable buildings for such institutions must await the growth of the institutions and the accumulation of a certain amount of public and private wealth. It is not surprising, therefore, that all the library and museum buildings of note in Chicago have been erected within the past twenty years and, that some of the most notable exist as yet only in the architects' designs.

Previous to the great fire of 1871 there were only two libraries open to the public in Chicago. One of these was that of the Young Men's Christian Association organized in 1841. The other was the Chicago Historical Society library, founded in 1856. The latter institution had its collection of 100,000 books, manuscripts and pamphlets, destroyed by the great fire of 1871, and the beginnings of a second

collection burned in the fire of 1874. A third collection was begun in 1877, which in 1890 was placed in the fireproof building on the corner of Dearborn Avenue and Ontario Street. This building, designed by Architect Henry Ives Cobb, has an exterior of Aberdeen red granite in the Romanesque style, and an interior in which there is no combustible material either in construction or furniture. The cost of the building was \$190,000.

The Chicago Historical Society was organized "to collect and preserve the materials of history, and to spread historical information especially concerning the Northwestern States." This purpose has been extended to cover the Mississippi Valley.

The main hall of the building, two stories in height, is devoted to portraits and relics of the representatives of the French regime in the Mississippi Valley. Here is a fireplace built of relics of the great fire—stones taken from the old Illinois Cen-



CHICAGO HISTORICAL SOCIETY

tral Depot, Cook County Court House, and the Nixon Building. On the right of the entrance is the John Crerar Hall, the lecture room of the society. The library contains manuscripts, books, maps and newspapers relating to the early history of the Mississippi Valley, and other historical relics, now placed beyond all peril from fire and made accessible to the public.

The Chicago Public Library

There is no telling how long the founding of the Chicago Public Library might have been delayed had not the calamity of the great fire aroused the sympathy of Thomas Hughes of England, the famous author of "Tom Brown's School Days." Mr. Hughes and those associated with him made an appeal to authors, publishers, scientific societies, and literary institutions of Great Britain, which resulted in the donation of about 7,000 volumes. These books, each of which bore a book plate stating that it was presented to the City of Chicago toward the formation of a free library after the great fire of 1871—as a mark of English sympathy, formed the nucleus of the Chicago Public Library. For a period of twenty-five years, the library occupied various quarters meanwhile increasing rapidly in size and reputation. In September, 1897, it moved into its present magnificent building, which occupies the entire frontage on Michigan Avenue, from Washington to Randolph Streets, and extending back to Garland Court on the west. The extreme dimensions are 352½ x 146 1-3 ft., and the height from the sidewalk to the top of the cornice is 90 feet.

The design is in a renaissance style of markedly Greek character by Shepley, Rutan and Coolidge, Architects. The exterior is of Bedford limestone with a granite base and the foundation rests on piles driven to a depth of 74 feet below the sidewalk.

The entrances are on the ends of the building. That on Washington Street, leads directly to the main staircase hall of nearly white statuary Carrara marble, illuminated by sparkling inlays and panels of glass mosaic, mother of pearl and shells. The mosaic floors are of marble. A magnificent marble stairway leads to the upper floors.

The delivery room on the second floor, and extending across the whole width of the building, is 134 by 48 feet in size, with a vaulted ceiling and a central dome of stained glass.

The books, which on January 1, 1909, numbered 365,000 volumes, and 60,000 unbound pamphlets, are stored in steel book stacks with glass floors. These stacks open directly from the delivery room.

The floor above the stacks is occupied by the reference and reading rooms. The former, 138 feet long, 38 feet wide and 30 feet high, with accommodations for 225 readers, is situated on the east front of the building and directly connected with the stack below by means of automatic electric lifts.

The north entrance, from Randolph Street, leads to the Grand Army Memorial Hall on the second floor, and to the great Periodical and Newspaper Reading Room on the fourth floor. This reading room is 142 feet long and 55 feet wide, seating 450 readers. It occupies the entire north front of the building and adjoins the reading and reference room, previously mentioned.

In addition to these main rooms, there are ample rooms for administrative purposes, storage of public documents, books for the blind, etc.

In a room on the upper floor, almost unknown to the public, is one of the most significant evidences of the growing national position of Chicago. The geographical location of this city, which marks it as the national center of trade and manufactures, marks it also as a center of art and learning and in some departments as *The National Center*. In the matter of libraries, Chicago is already the National Headquarters, for the room referred to on the upper floor of the Public Library is the headquarters of the American Library Association, removed here from Boston in September, 1909.

The construction of the Chicago Public Library building is strictly fireproof, and the total cost was about \$2,125,000. A description of this building is not complete without a comment upon the interior decorations which mark an epoch in Chicago architecture by their rich and permanent character. The main material is white marble, which has become the standard finish for our down-town buildings where light is of the utmost importance. The special innovation in this library is the inlaying of the marble with designs in mosaic of colored glass, mother of pearl and semi-precious stones, that add richness and brilliance of effect without detracting from the general lightness of the marble.



THE CHICAGO PUBLIC LIBRARY. 847



T. B. BLACKSTONE MEMORIAL LIBRARY

In Europe the use of marble and mosaic for interior decoration has been common from the days of ancient Greece and Rome to the present time. In this country such materials have only come into general use in connection with the development of fire-proof buildings. The earlier use of marble in the United States could best be described under the title of "the abuse of marble." Therefore it is a matter of interest to learn the impression made by our later Chicago buildings on a European observer familiar with the best work of the old world.

Dr. A. B. Meyer, the distinguished director of The Royal Museum in Dresden, Germany, comments thus on the general arrangement, construction and decoration of the Chicago Public Library:

"In Modern Europe, I would not know where to find anything similar in this line. The new German library buildings certainly cannot compare with it. I am quite unable, within the limits of this report, to give a description of the lavish magnificence here displayed. I must curtail myself with saying that as a whole whatever might be said of single portions, the structure is an imposing artistic creation, to which justice cannot be done in a few words."

The T. B. Blackstone Memorial Branch Library

This building, erected as a memorial to T. B. Blackstone and presented to the city by his widow, is said to be the most beautiful and costly library building of its size in the world. It is notable also as marking the beginning of a series of branch libraries which are to be built in various sections of the city so as to bring the great collection of books into closer touch with the people.

This branch library, located at the intersection of Lake and Washington Avenues, and 49th Street, is 100 by 45 feet in size. It is constructed of white granite in pure Grecian Ionic style, from the designs by S. S. Beman, Architect.

The interior contains a book room on the left, with a capacity of 20,000 volumes, a reading room on the right, and a small reading room at the rear, all opening from a rotunda which is finished in Italian statuary marble.

The interior finish is of the finest mahogany and marble and the book stacks are of bronze with shelves of mahogany.

Newberry Library

On the "North Side" of the city, between Clark Street and Dearborn Avenue, and three-quarters of a mile north of the river, is Washington Square. Facing this square on the north stands a building of pink Milford, Conn., granite, Romanesque in style, massive, dignified, and yet graceful in design. This is the Newberry Library, the gift to the city of one of its citizens, Walter Loomis Newberry.

Mr. Newberry died in 1868, leaving by his will one-half of his property, after the death of his direct heirs, for a free public library in the northern part of the city. After the direct heir died in 1885, the property amounted to over two million dollars.

The Newberry Library is solely for works of reference. In 1896, a scheme of co-operation was entered into with the John Crerar Library, by which the Newberry books on science and the useful arts were transferred to the Crerar Library and the two libraries arranged to cover the field jointly.

The arrangement of the building is somewhat unusual, in that the books on each subject are placed in a separate room, with space for the readers immediately adjacent. This scheme was laid out by the librarian, Mr. W. F. Poole, and the design of the building by Henry Ives Cobb, Architect.

The present building, erected in 1890, and which is but one wing of the ultimate design, cost \$545,000 and has a shelving capacity of a million volumes.

The John Crerar Library

The latest established of the free public libraries of Chicago owes its existence to the bequest of the late John Crerar, for many years a prominent citizen of this city.

Mr. Crerar died in 1889, leaving a fund estimated at \$2,500,000, for the erection of a library building that shall be "tasteful, substantial and fireproof," and a collection of "books and periodicals selected with a view to create and sustain a healthy, moral and Christian sentiment in the community." The fund has increased in value until it is now estimated at \$3,400,000.

The directors of the library adopted at the outset the policy that the whole of the bequest was not too great for an endowment fund, and therefore the endowment should not be encroached upon either for

land, buildings, or books. A building fund was started that now amounts to \$900,000. Because of this conservative policy of the directors, the building for the John Crerar Library cannot be chronicled among the achievements of the past half century; but if a site shall be secured on the Lake Front Park, the building will follow not long after the publication of this book.

Meanwhile, the library has been started in the Marshall Field Building, as a reference library to cover such departments of knowledge as are not fully covered by the other great libraries. The books now number about 260,000 volumes.

The Chicago Academy of Sciences

In the year 1857, an association, "to promote science," was organized under the name of "The Chicago Academy of Natural Sciences." It began at once to make collections, but in the great fire of 1871 their building, supposed to be fireproof, was destroyed. In 1891, a gift was obtained of \$75,000 from Mr. Matthew Laflin, of Chicago, to which the Lincoln Park Board added \$25,000, and gave a site in Lincoln Park.

The \$100,000 thus obtained was put into the building that now stands in Lincoln Park, facing Center Street. The architects chosen were the Chicago firm of Patton & Fisher (now Patton & Mil-

ler). The small amount of money available was sufficient only to erect the present building 133 feet long, 61 feet wide and 70 feet high, planned so that it may form part of a larger structure.

The exterior is designed in the Renaissance style of Bedford limestone, with cornice of terra cotta and a roof of red tile. The construction is strictly fire-proof.

In spite of its small style, compared with the museums in other cities, this building has received special commendation from Dr. Meyer, director of the Dresden Museum, on account of the rational planning by the architects to meet the needs of a museum. Dr. Meyer remarks: "Examples are odious, but it would be really hard to mention a museum at the erection of which the proceedings were as judicious as at the erection of the Academy of Sciences in Chicago."

The first floor contains the library at one end and the offices of the Lincoln Park Commissioners at the other end. The museum proper occupies the whole of the second floor and consists of a central hall, two stories in height, surmounted by a domed ceiling and lighted from above. Surrounding this hall on all sides is a gallery supported by columns spaced to correspond with the exhibit cases, which run from each column to the outer wall, thus dividing the space below the gallery into alcoves, each of which is lighted by a broad window.



NEWBERRY LIBRARY.

The space in the gallery is similarly divided by low cases and a graceful colonnade supports the domed ceiling of the central hall. The gallery railing is designed to carry, as a part of its structure, cases in the form of a counter.

The essential feature of this museum design is that the architects first determined the proper length and depth of the exhibit cases, and the most economical spacing of such cases. Then with these dimensions as a unit of measure, the windows on the exterior were spaced to correspond with the alcoves formed

erected on the Lake Front opposite the end of Adams Street. This building was constructed in connection with the "World's Fair," which contributed \$200,000, that it might have a central location for the holding of Congresses. The Art Institute gave \$500,000 for the building and the city furnished the site.

The building was designed by Shepley, Rutan & Coolidge, Architects, in the Italian Renaissance style, and as originally built was 350 feet long and 225 feet wide.



THE ART INSTITUTE OF CHICAGO—MAIN ENTRANCE.

by these cases, and the columns placed opposite the end of the case. Thus the exhibits and the architecture are blended into one design, and the exhibits accentuate the architectural details. In this way the exhibits are not only interesting individually but help to decorate the interior.

Art Institute

The "Art Institute of Chicago," beginning with an art school founded in 1866, received its present name in 1883. In 1886 it erected a museum building which soon became too small, and in 1893 it was sold to the Chicago Club and the present building

The exterior is of Bedford limestone. The broad steps of the entrance are flanked by magnificent bronze lions by E. Kemeys. The building contains two lofty stories of galleries for paintings, sculpture and other works of art, above a lofty basement devoted to the art school. The galleries on the first floor, devoted to sculpture, are lighted by windows, while those for paintings on the second floor are lighted from the roof.

Of special interest from an architectural point of view are the Fullerton Memorial Hall, which seats 500 and is used for lectures, and the Ryerson



MAIN ENTRANCE, ART INSTITUTE, HALL LOOKING SOUTH.



INTERIOR VIEW OF RYERSON LIBRARY, ART INSTITUTE, CHICAGO.

Library, which contains a splendid collection of books on art.

Another notable room is the Blackstone Hall for architectural casts, 208 feet long, 58 feet wide, and 33 feet high, where are displayed full size casts of many interesting details of European buildings.

This collection of casts, the gift of Mr. and Mrs. T. B. Blackstone, is unique in this country. Some of the casts are 35 feet long and more than 30 feet

the building and will cost probably not less than \$80,000.

The Art School, maintained in connection with the Art Institute, is the most comprehensive and probably the largest fine art school in the United States.

In concluding this description of the Libraries and Museums of Chicago, we quote again from Prof. Meyer of Dresden. He says of Chicago: "Its architecture exhibits more evidence of an American



MAIN STAIRWAY, ART INSTITUTE.

high. The largest pieces are portals of the cathedrals of Bordeaux, Charlieu, and St. Gilles, and the choir gallery of Limoges.

The various additions to the building have brought the present cost up to over a million dollars and the value of the art collections is estimated at an equal amount. There remains to be built the monumental staircase of marble, which will occupy the center of

national style than is seen in the other great cities of the eastern part of the country. In originality, in youthful vigor, and in the astonishing rapidity of its development Chicago excels all, with a prospect of a yet greater future. The motto 'I will' is often found on the allegorical figure of the city, and the words appear to me most suitable to indicate the energetic, aspiring character of its citizens."

The Proposed Field Museum Grant Park, Chicago

The Field Museum of Natural History was founded at the close of the World's Columbian Exposition and from that time until his death, Marshall Field was one of its chief supporters.

For a number of years before his death occurred, the question of a new building had been under consideration as the Museum had grown far beyond its present quarters in the old Art Building of the Exposition—quarters which had never been suitable for

Front, where it would serve as the culminating feature of the decoration of Grant Park and at the same time, be the pivot or center of the whole park and boulevard system of the city. It was thought that a very high standard should be set in the design of the new building in order to influence the design of all the buildings overlooking the park, so that the final appearance of the park and its surroundings should be as noble and monumental as is possible under our lax methods of regulating these matters. The collections of the Museum being educational in their



GALLERY OF FRENCH SCULPTURE—ART INSTITUTE.

the exhibition of Natural History collections. The temporary character of the building and its non-fire-proof construction were also strong reasons for providing safer and more permanent quarters.

In the discussion of the new building with the architects, D. H. Burnham & Company, it was decided that the building should be made primarily to house, exhibit and protect the great collections in the best possible manner, and according to the latest ideas in Museum practice—in addition to this, the building was to be made monumental in character as would benefit its probable location on the Lake

effect on the people, it was thought that the designers of the building should also help in this educational work by creating a monumental work of art at the same time they fulfilled adequately all the needs of a modern, up-to-date museum.

The building was planned to be erected in Grant Park, with its principal entrance on the center of Congress Street prolonged beyond the Illinois Central tracks—the west elevation to be about 1,000 feet from the buildings on Michigan Avenue. The length of this elevation is approximately 1,000 feet and consists of a great central pavilion, two end pavilions

vilions, each one on the center of Van Buren and Harrison Streets, respectively, and two great colonnades connecting these pavilions with the central one.

The central pavilion consists of a portico of monumental proportions, forming the main entrance to the museum—this portico is crowned by an attic, decorated with heroic figures above the Ionic columns, and by a pediment—two flanking stair pavilions complete the central pavilion as a whole, and a great flight of steps takes up the height of the stylobate on which the orders of the central and side colonnades are placed. The side colonnades consist of free standing Ionic columns placed very close to the wall so that the light will not be barred from entering the great windows between them. In height these columns mark the two public floors of the museum, it being the intention to use the third and ground floors for working floors. In length, these colonnades mark the long exhibition halls of the interior, side-lighted and placed with their long axes lying north and south as best for side-lighting in this latitude.

The central pavilion is carried back into the building to the center in the form of a great interior nave—another hall of similar proportions is carried through the building from north to south and at the intersection of these great interior halls or naves, a dome is placed as the crowning feature of the whole composition—in dimensions this dome will be comparable with the greatest domes in the world and combines the elements of several of them.

The elevation of the building toward the east is similar to that toward the west and the two end elevations are alike, consisting of a great colonnade with a central pavilion marking the center. The material of these elevations will be granite, with two roofs of terra cotta tile matching the granite.

The cost of the building will be cared for by the bequest of Marshall Field of \$4,000,000 with the

interest which has since accrued. A sum of \$4,000,000 was also left for the maintenance of the building and for carrying on the museum work.

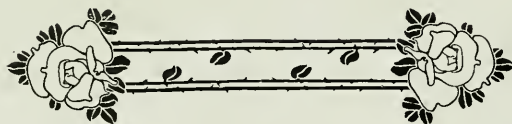
It is the intention to connect the museum and its setting of terraces, balustrades, etc., with Michigan Avenue by a great plaza, similar to the Place de la Concorde and others in Europe. This is to be done by covering over the Illinois Central tracks for a space of several blocks and appropriately framing in the great space so created, by walks, balustrades, planting, etc., and forming a composition of museum, plaza, boulevard and park which will be worthy of its location in the heart of the city.

In the interior the building consists of the great cross, formed by the two naves and dome and in the four corners left, are placed the long exhibition halls. These halls are so designed that the cases fit in between the windows and form alcoves on each side of the hall, leaving a broad aisle down the center—in each alcove is a large window throwing light into the cases—these halls are separated by light courts, and are connected at the ends by transverse halls, similar in width and arrangement to them.

The elevators and main stairways are placed near the entrance and smaller stairways are conveniently located at the ends of the long exhibition halls. The Directors' offices are placed near the main entrance—the Curators' offices are on the third floor, in connection with the working forces of the different departments.

Several lecture halls are placed in the building, the two principal ones, seating 600 and 1,200 each, being on the ground floor, with a separate exterior vestibule and entrances at the south end of the building.

The rest of the ground floor is given up to workshops for the rough work of the departments, for storage and for the heating plant.



Chicago Theatres

By BENJAMIN H. MARSHALL

THE first public entertainment in Chicago for which an admission fee was charged and of which any record has been preserved occurred shortly after the village was incorporated. February 18, 1834, the Chicago Democrat announced the coming appearance of Mr. Bowers, Professor "de Tours Amusant" in a series of fire-eating feats, ven-

But in the fall of that year a license to produce plays in Chicago was finally secured. Witness the following petition:

"Chicago, October 17, 1837. The subscribers respectfully petition the Honorable the Mayor and Council of the City of Chicago for a license to perform plays in said city. They respectfully represent that this establishment is intended to afford instruction as well as amusement; that they are encouraged and patronized by the leading portion of the inhabitants of the city who are interested in their success; that they propose to remain here during the Winter, and that they make no calculation to receive more in the city than what they will expend during their stay, and, therefore, they trust that in offering a rate for license these facts may be taken into consideration. Isherwood & McKenzie, the Petitioners, request this license for six months, if agreeable to the Board."

The license fee was fixed at \$125.00, and after protest by the petitioners, it was finally paid. Isherwood & McKenzie now needed only a suitable place and they were ready to begin their theatrical ventures.



FOYER—OLYMPIC THEATRE.

triloquism and legerdemain. This performance was to commence at "early candle light," "tickets to be had at the bar," and was given at the Mansion House on Lake Street.

Following this early public offering, at brief intervals we find mention of other similar entertainments, concerts and diminutive circus, and church fairs, but not until after Chicago was incorporated as a city was any attempt made to open a theatre or present a dramatic production. The first attempt, however, failed. May 29, 1837, Messrs. Dean & McKinney, well known in theatrical circles in the East, applied to the Common Council for a license "to open a theatre in some suitable building for the term of one or more months as business may answer." The council, however, apparently saw no reason to greatly encourage the project and named \$100.00 as the license fee. Evidently the promoters considered this too much to pay, and they left the city without giving a performance.



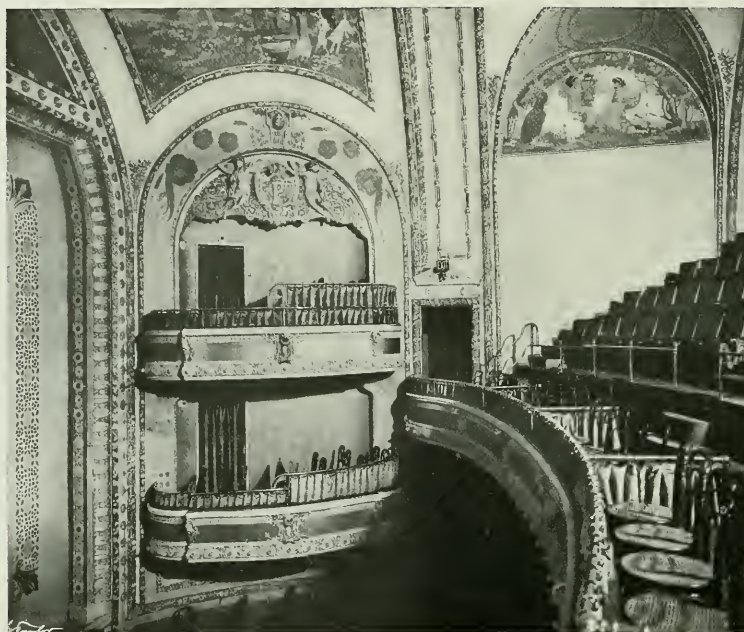
FOYER—McVICKER'S THEATRE.

The place selected for the first dramatic production in Chicago was the then deserted Sauganash Ho-

tel, which stood on the lot where was erected in 1860 the "Wigwam" in which Abraham Lincoln was first nominated for the presidency of the United States. Mark Beaubien had erected a log house on the East side of Market Street, about 100 feet south of Lake Street, which he afterward converted into a tavern and called the "Sauganash" after a famous Indian chief of that name. Messrs. Isherwood & McKenzie secured the Sauganash and converted the dining room into a theatre seating about 200 persons. The opening production in Chicago's first theatre

on the American stage, William Warren, afterward the favorite of the Boston public, and a flaxen haired boy of nine, who was destined to become the dean and greatest favorite of the American stage, Joseph Jefferson. September 23, 1903, when Chicago was celebrating her centennial, Joseph Jefferson stepped before the curtain at Powers' Theatre and said "I played in Chicago sixty-five years ago."

In 1838 the Sauganash was abandoned as a theatre and the place of production transferred to the "Rialto" at 8 and 10 South Dearborn Street, nearer



PRINCESS THEATRE.

bore the extremely melodramatic title—"The Idiot Witness of a Tale of Blood," to which an admission fee of seventy-five cents was charged. It is worthy of remark that Alexander McKenzie, the junior partner in this first enterprise, was an uncle of Joseph Jefferson.

The company which played in Chicago during the first season was an excellent one, but no complete record of the plays presented has been found. In 1838 the company returned. Among its members were two who afterward achieved the highest distinction

the center of Chicago. The casts in these early plays were of exceptional quality, but the returns were small. Among the players of this period was I. M. Singer, afterward famous as the inventor of the Singer Sewing Machine.

August 31, 1839, the third theatrical season was opened by Joseph Jefferson (father of "Rip") who had become the partner of McKenzie in the enterprise. During this season the first presentation of a Shakespearean play was given in Chicago, October 7, 1839. "Romeo and Juliet" was the play se-

lected, Mrs. McClure appearing as Juliet and Mr. Charles Kemble Mason as Romeo. This was followed by "Macbeth," "Hamlet," and "The Merchant of Venice." October 30, 1839, "The Rivals" was first produced in Chicago. A glance at the cast in the play will show how greatly the dramatic art in the early days of Chicago was indebted

Rialto passed through various vicissitudes and changes of name and finally burned February 1, 1847.

The year 1847, however, that saw the destruction of the Rialto, was also to see the building of the first actual theatre in Chicago. The city then contained 15,000 inhabitants; the dire effects of the panic had



PRINCESS THEATRE.

to the Jefferson family—it included Joseph Jefferson, senior, his wife, his two sisters, his niece, his stepson, his cousin and his niece's husband.

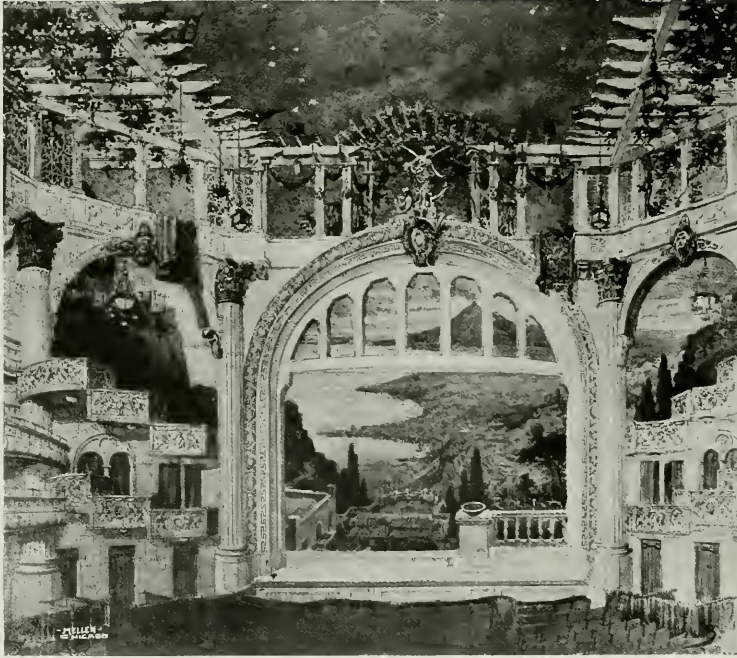
But the results of the panic of 1837 were now making themselves painfully felt in Chicago. Theatrical ventures as well as other business enterprises languished, and no dramatic company of special repute appeared in the city for several years. The old

passed and it was the year of the great River and Harbor Convention which would bring here thousands of people from all over the country. Under these conditions Mr. John B. Rice, later destined to become the mayor of this city, came to Chicago from Buffalo and entered into a contract for the erection of a building to be used as a theatre. Mr. Rice received local support in his project and a theatre building

costing \$4,000.00 was completed in less than two months and formally opened June 28, 1847. It was a very plain wooden structure, two stories high, and stood where the Unity building now is. But at least it was arranged like a theatre and every part of the house afforded a good view of the stage.

Many actors well known to the American stage trod the boards of Rice's Theatre in those early days. Edwin Forrest and Junius Brutus Booth both appeared there in 1848, also Mr. James H. Mc-

This period saw the opening of another theatre in Chicago which deserves more than passing mention. November 5, 1857, McVicker's Theatre was opened. No other theatre has so long preserved its name and popularity. All the great actors of the day played at McVicker's. Joseph Jefferson produced "Rip Van Winkle" for the first time here at this theatre in 1868. In 1871, McVicker's was entirely remodeled at an expense of \$90,000.00 and six weeks later destroyed by the great fire. Again



INTERIOR OF THE BEAUTIFUL CORT THEATRE,
Showing mural painting on steel curtain. Dearborn, near Randolph.

Vicker. But the career of the theatre was short; in 1850 it was destroyed by fire. However, the theatre was now an established institution in Chicago. Early in 1851 Mr. Rice had completed a new and more pretentious play house on practically the same spot as the old one. An innovation was made in this new Rice's Theatre by abolishing the pit with its noisy occupants, and providing a gallery at the top of the house. In 1861 this theatre was converted into a business house.

the theatre was rebuilt and reopened August 15, 1872; again remodeled in 1885 and again destroyed by fire, August 26, 1890. The present McVicker's Theatre was opened March 31, 1892, when Joseph Jefferson, William J. Florence, Mrs. John Drew, Miss Viola Allen, and Frederick Paulding appeared in "The Rivals." On many occasions Mr. McVicker appeared in his own theatre, either at the head of his company, or in support of some of the visiting stars.



MAJESTIC THEATRE.

Many theatres were built in Chicago during the decade before the fire; Wood's Museum on Randolph Street, Aiken's Theatre on Dearborn Street, Crosby's Opera House, famous in its day, on the north side of Washington Street between Dearborn and State Streets, Bryan Hall, 87-89 Clark Street, transposed by Mr. Hooley into Hooley's Opera House in 1870. After the fire this theatre was rebuilt, and after being called the Coliseum and Hamlin's Theatre, was remodeled in 1880, and leased to Mr. John A. Hamlin as the Grand Opera House with Mr. Will J. Davis as active manager. Other places of amusement opened during this period were the first Academy of Music and the first Olympic Theatre. The Globe Theatre on Desplaines Street between Madison and Washington Streets, a frame structure was the only theatre in Chicago to escape destruction by fire.

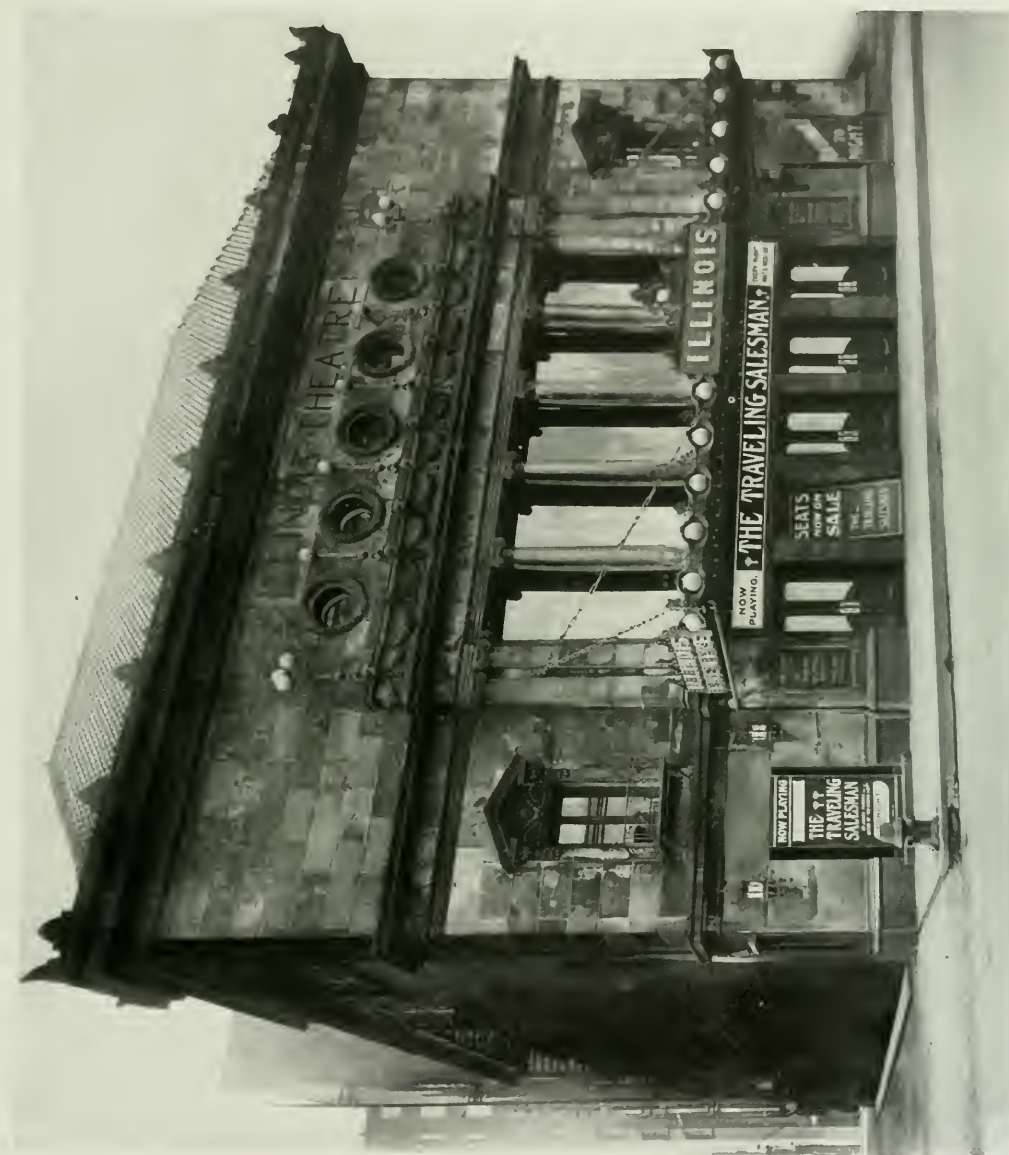
Of the more prominent theatres built after the fire, Hooley's was opened October 17, 1872. In 1876 and 1877 it was known as Haverly's. It then became Hooley's again and so remained until it passed into the hands of Mr. Harry J. Powers in 1898. The theatre was then reconstructed in accordance with the designs of Mr. Benjamin H. Marshall, afterward architect of the Illinois and Colonial Theatres, and was reopened as Powers' Theatre. Haverly's Theatre was built in 1875, the walls of the old postoffice destroyed in the fire, being used in its construction. This theatre was demolished in 1880. In 1881 another theatre was built on Monroe Street between Dearborn and Clark and called Haverly's. January 31, 1885, during the engagement of Irving and Terry, Ellen Terry rechristened this theatre the "Columbia." Mr. Will J. Davis, formerly connected with the old Haverly's and the Grand Opera House, became the lessee of this theatre in 1889 and remained in control of it until March 30, 1900, when it was destroyed by fire.

The Chicago Opera House was opened in 1885; the new Chicago Theatre in 1875, which became the Olympic in 1885; the Haymarket in 1887; the Auditorium in 1889, the Schiller, later the Dearborn and now the Garrick Theatre in 1892; the Great Northern Theatre in 1896; the Studebaker in 1898.

The opening of the Illinois Theatre October 15, 1900, marked a new era in theatre building, inasmuch as this was the first building in Chicago to be constructed and employed solely for theatrical purposes. Hyman & Davis Company were the builders of the new theatre and Will J. Davis the manager. On the suggestion of Mr. Charles Frohman it was called the Illinois. Like Chicago's first theatre this twentieth century theatrical temple bore an Indian name. The Iroquois was the third Chicago theatre with an Indian name. The unfortunate calamity which befell this house so soon after its opening is alas, too well remembered. That it was properly constructed and meant by its owners, builders and architects to be a model theatre, is attested in the fact that its structural and decorative equipment was scarcely injured by the fire which was confined to the scenic investitures of the spectacle which occupied the stage. The loss of life was occasioned by the spontaneity of the fire which consumed all the oxygen in the upper tiers of the theatre.

And as the year 1910 approaches, Chicago has in the last year built something like twenty-five first class, modern neighborhood theatres, besides completing the New Cort Theatre on Dearborn Street, the American Music Hall on Wabash Avenue and Peck Court and the new Blackstone Theatre on Hubbard Court and Wabash Avenue, just starting, and which will open September 1, 1910, as the finest theatre architecturally west of New York.

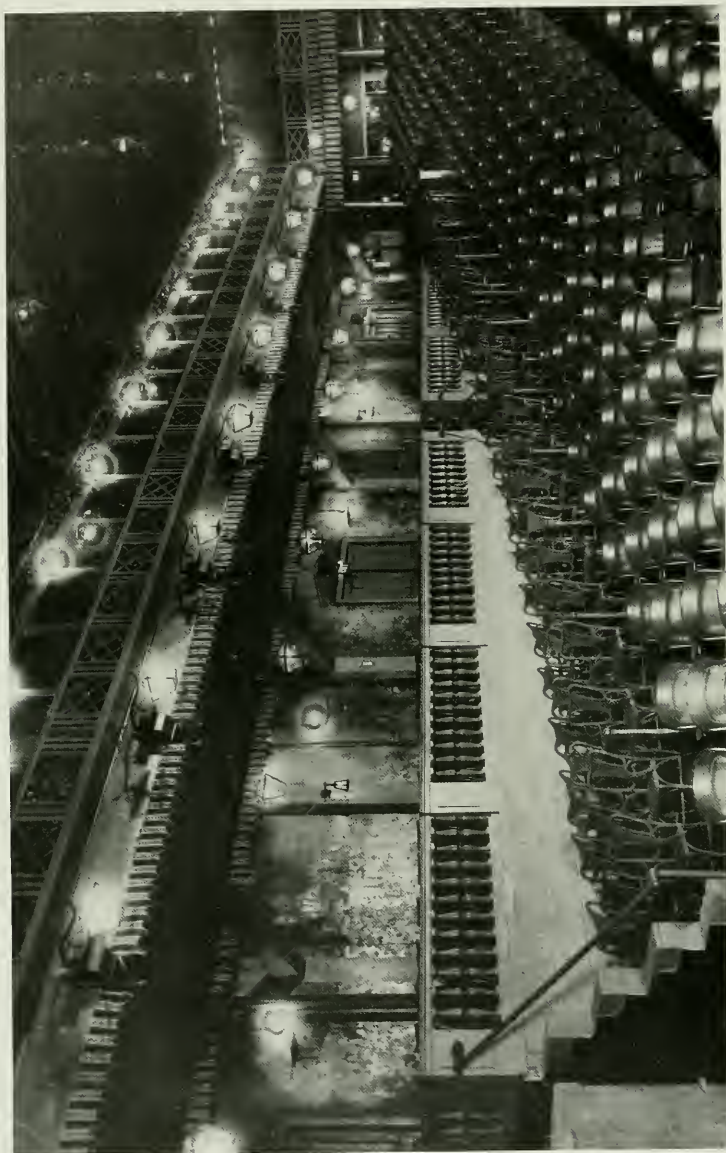




Marshall & Fox, Architects.

ILLINOIS THEATRE.

Will J. Davis, Prop.



AMERICAN MUSIC HALL.
Interior View Showing Left Section and Promenade and Portion of Illuminated Ceiling.

Chicago School Buildings

By DWIGHT H. PERKINS

ONE may observe progress of various kinds by studying Chicago elementary school buildings. The growth of the city, the changes in building methods and materials, the development of educational requirements and the increase in size as well as expenditure have been constant from year to year are clearly apparent to anyone who studies the

(18) schools in Chicago; today, there are two hundred and seventy-eight (278) elementary schools. The first high school was built in 1855-1856 and served for the entire city until 1875, while today there are seventeen (17) high schools and one Normal School for the training of teachers for the public school system.



MOSELEY SCHOOL.

schools of today, reflecting the expansion of the community as they do.

It is possible to make a survey practically complete from existing buildings. But few have been burned or razed and such as have been may be studied by their counterparts still standing.

The north building of the Moseley School was built in 1856. At that time there were eighteen

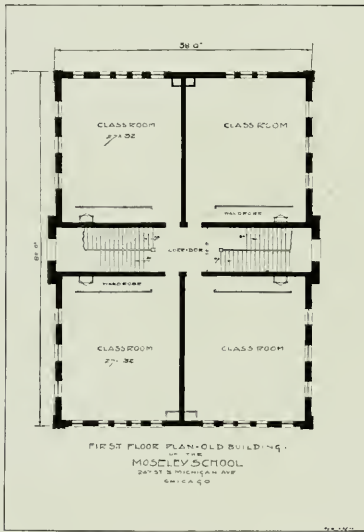
To give a fairly complete history of Chicago public school buildings, one would have to describe the following twenty-six schools in the order named:

1, Moseley; 2, Jones; 3, Goldsmith; 4, Skinner; 5, Sexton; 6, Raymond; 7, McLaren; 8, Haven; 9, Van Vliissingen; 10, Tennyson; 11, Franklin; 12, Yates; 13, Willard; 14, Dewey; 15, Coonley; 16, Armour; 17, Hamilton; 18, Fiske; 19, Graham;

20, Harvard; 21, Hayt; 22, Penn; 23, Rogers; 24, Moos; 25, Tilton; 26, Nobel. Each of these is typical or a duplicate of many others and the list represents the entire city.

No reference will be made to school buildings in annexed portions of the city, as none of these is distinctive or valuable and they are being torn down as rapidly as circumstances permit.

As it is not feasible within the limits of such an article as this to describe all these buildings, the writer will compare the Moseley and the completed Tilton School without showing all of the gradual steps by which the latter was developed from the



former. The Nobel is later than the Tilton, but is in construction at this time, (October, 1909), and cannot be photographed.

The five views of elementary schools other than the Moseley and Tilton—shown herewith of the Jones, McLaren, Willard, Graham, and Hamilton schools, fairly represent the twenty-six listed above and illustrate the various kinds and styles of schools as well as the work of the different Chicago School Architects.

There are also shown three views of high schools. The original "Chicago" High School on West Monroe Street contained a few ordinary class rooms only. They were for "academic" studies and no provision

was made for laboratory work in the sciences nor for technical work, such as is common now. Nor were there any provisions for physical culture then, while gymnasiums are considered essential now.

It would be interesting to illustrate the Normal School, but as there is but one such institution in Chicago, no comparative exposition can be made.

The comparison of the Moseley and Tilton schools, above referred to, is presented in the following parallel columns. It is also given by the illustrations which include cuts of the plans. The endeavor has been made to reproduce the plans at similar scales so that their differences in size are practically proportional to the differences in the dimensions of the actual buildings:

	MOSELEY SCHOOL Common Combustible Construction	TILTON SCHOOL (when completed) Fireproof Throughout
Cost	\$40,000.00	\$320,000.00.
Cubic contents	307,600 cu. ft.	2,125,000 cu. ft.
Cost per room	\$3,333.00	\$8,400.00.
Cost per pupil	\$66.00	\$168.00.
Breadth	58 feet	146 ft., 6 in.
Length	78 feet	258 ft., 0 in.
Height	3 stories and basement	4 stories and no basement.
Number of rooms	12.	40.
Number of pupils	600.	2,000.
Assembly hall	None	700 seats.
Gymnasium	None	One.
Manual training dept.	None	One.
Domestic science dept.	None	One.
Library	None	One.
Construction room	None	One.
Teachers' rooms	None	Six.
Principal's office	None	One.
Assistant principal's office	None	One.
Heating	Direct steam	Indirect steam.
Ventilation	None	Mechanical system.
Exterior	Brick	Brick.
Floors	Wood throughout	Wood top surface in class rooms. Asphalt for all corridors, stairs and toilets, all on fire clay tile arches.
Toilet rooms	2 basement toilets	Tower toilets, one for each sex in each story.
Toilet room walls	Plaster	Enamel brick.
Flexibility of plan	None	May be 20, 30, or 40 class rooms.
Playgrounds	Not described as not being a part of the building. The modern practice is to provide large playgrounds for every school.	
Stair capacity	800 pupils	2,200 pupils.
Size of class rooms	27 ft. x 32 ft.	26 ft., 6 in. x 33 ft.
Window glass area in each class room	126 sq. ft.	160 sq. feet.
Unilateral light in class rooms	None	All rooms.
Cross light in class rooms. All rooms	None.	
Wardrobes	Large Area	Small area.
	Not ventilated.	Ventilated.
	Accessible from halls	Accessible from rooms only.
Blackboards	Composition	Natural slate.
Corridor wainscot	Wood ceiling	Glazed brick.

These columns show not only the increased cost due to changes in building methods and cost of labor and material, but they also show the very great change in educational demands. Formerly, the class room was everything; now, it is only a little more than half of the facilities demanded for the pupils.

and planned originally and wholly for high school purposes. The development is best shown by the two photographs of the Wendell Phillips, and Albert G. Lane high schools. These schools show the absence and the presence of technical or manual training courses for two, three or four years in addition to the usual academic courses. In many



D. H. Perkins, Architect.

TILTON SCHOOL.

A comparison of "yard improvements" would also be interesting although not strictly a part of school building. Formerly an ordinary yard with a wood fence was sufficient. Now it must be paved and then fenced with concrete and iron. Provision must also be made for planting and for gardening, but, as all of these relate to "education" rather than to "building," they are not included here.

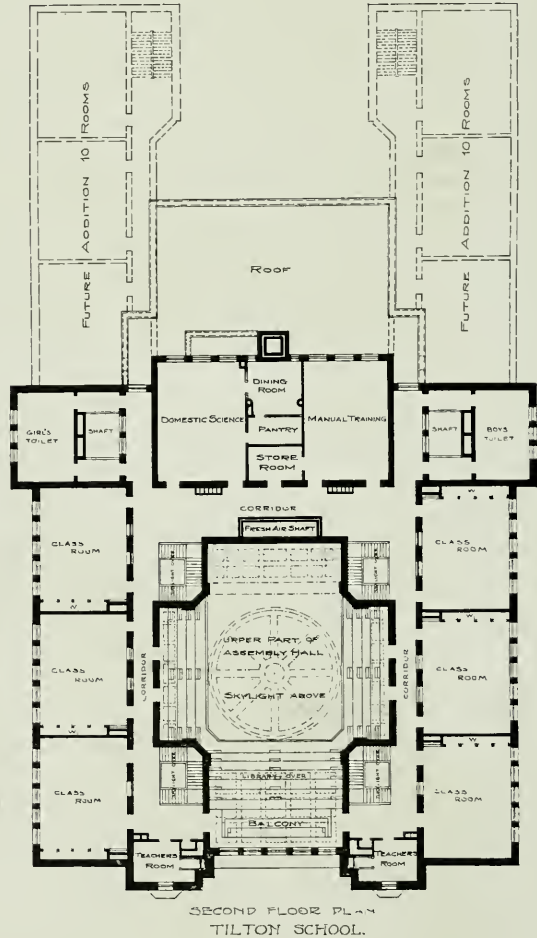
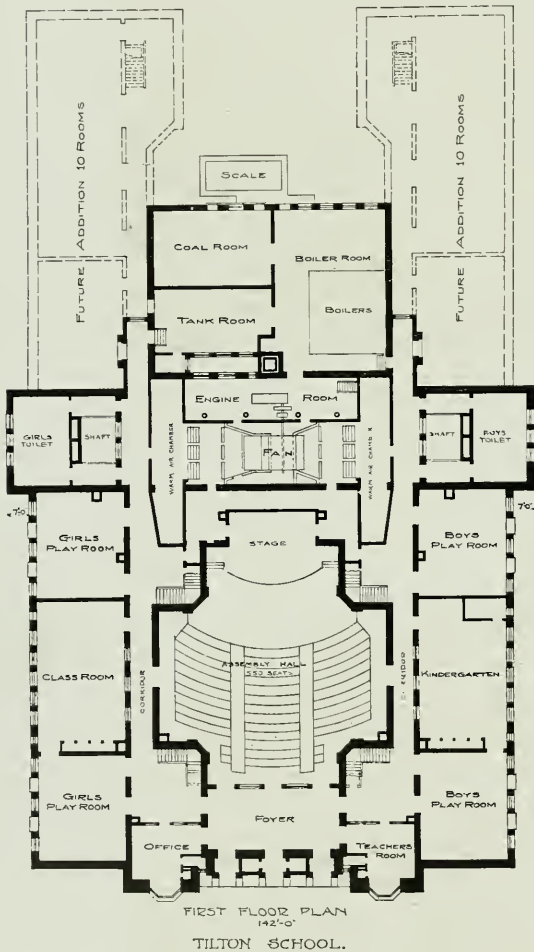
There are seventeen high schools in Chicago at this date. Of these but seven were built at one time

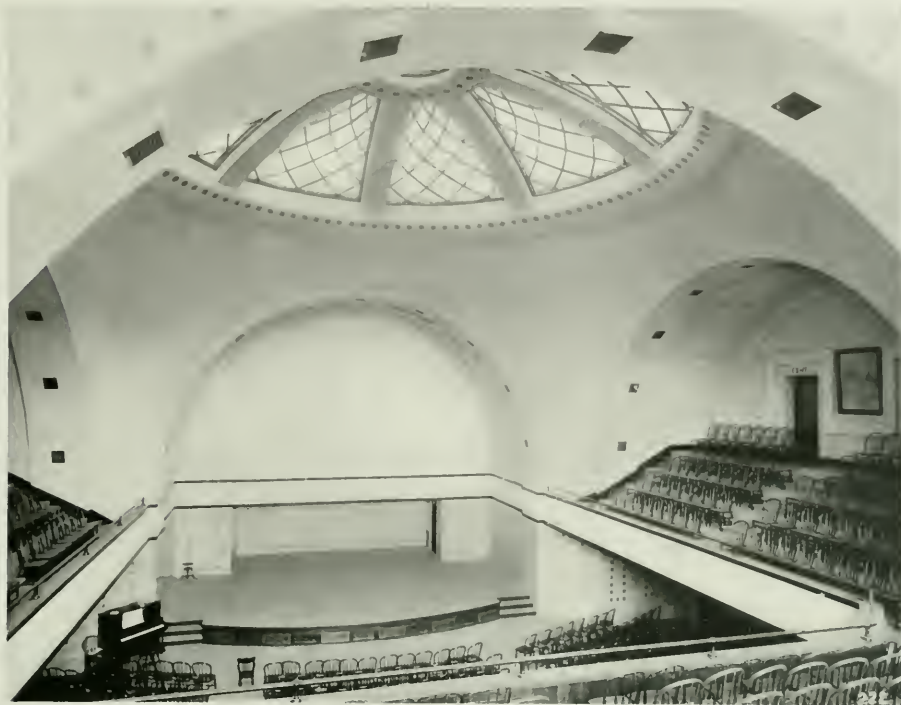
particulars the differences in construction pointed out between the Moseley and Tilton Schools apply to the early and late high schools.

A type of school not referred to above nor shown in the illustrations has been developed by the construction of additions to existing buildings. It has been found advisable to modernize a large number of old buildings while increasing their class room capacity. This has been done by constructing fireproof extensions including assembly halls, gymnasiums,

manual training and domestic science rooms with the class rooms. Typical instances are the Jackson, Brentano, Cornell and Farragut schools. In each of these cases—while making a complete modern plan—the exterior design has been made to conform exactly to the old building, becoming a natural or corresponding extension of the original structure.

Viewing all the photographs will give the differences and the development in exterior effect or architectural design. Similar study would reveal in like manner the changes in construction and the greater requirements of the later buildings and all would illustrate clearly and typically "A Half Century of Chicago Building," as well as a half century of municipal change and growth.





ASSEMBLY HALL, TILTON SCHOOL.



W. B. Mundie, Architect.

ALEXANDER HAMILTON SCHOOL.



JONES SCHOOL.



Normand S. Patton, Architect.

FRANCES WILLARD SCHOOL.



GRAHAM SCHOOL.



J. J. Flanders, Architect.

McLAREN SCHOOL.



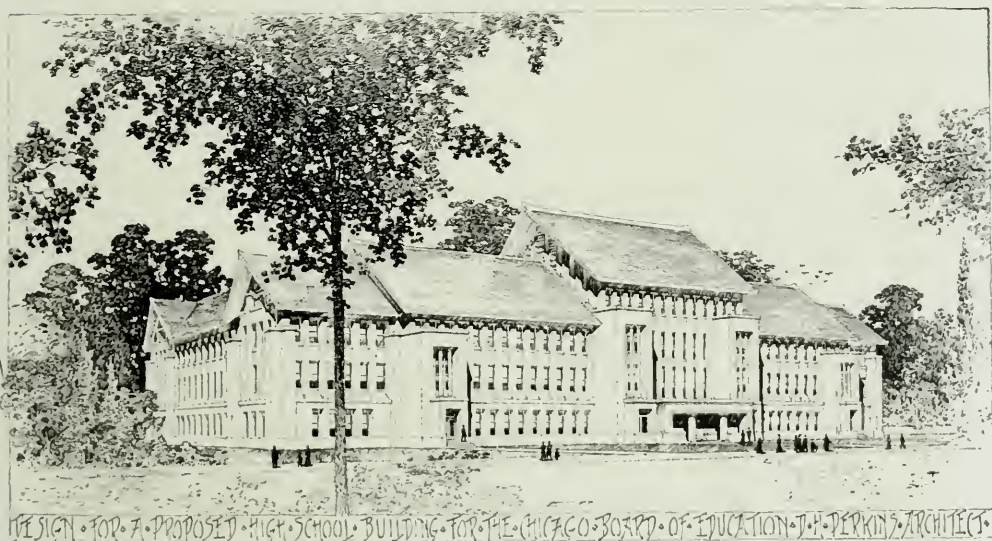
WOOD-WORKING SHOP, ALBERT G. LANE TECHNICAL HIGH SCHOOL.



MACHINE SHOP, ALBERT G. LANE TECHNICAL HIGH SCHOOL.



WENDELL PHILLIPS HIGH SCHOOL.



Railway Terminals

By CHARLES S. FROST

THE first railroad chartered from Chicago to the West was the Galena & Chicago Union Railroad.

On October 10, 1848, the brig "Buffalo" arrived at Chicago with the first locomotive "The Pioneer." One month later the road then extended 10 miles west and its rolling stock consisted of 6 freight cars, one passenger coach and the "Pioneer."

In 1867 one through passenger train each way daily furnished ample accommodations for passengers travelling between Chicago and Council Bluffs. From this nucleus the present great system has been

Union Railroad in 1848. It stood on what is now a triangular piece of vacant ground west of Canal Street south of Kinzie and but a short distance west of the west abutment of the City bridge that crosses the north branch of the Chicago River at Kinzie Street.

In those days there was a narrow street named West Water Street that ran close along the north branch of the Chicago River at the east of what is now Canal Street. This depot ran east and west and its east end was entered from this West Water Street. Building faced the railroad tracks which



GALENA & CHICAGO UNION DEPOT, CANAL AND KINZIE STREETS, CHICAGO.

developed, which for the year ending June 30, 1909, had about 900 passenger trains a day and carried over its rails more than 27,000,000 passengers.

It is not my purpose to give here the history of the development of a railway system, neither to discuss or even touch the railway terminal problem, but rather to trace briefly the growth of the terminal passenger station in Chicago of this one system which is typical in many ways of the numerous other systems having terminals in Chicago. From a history of the road published in 1905 entitled "Yesterday and Today" I am able to quote description of the early buildings, and to give here a few illustrations.

The first railroad station that was built in Chicago was a one story wooden affair built by the Galena &

were south of the station. Whatever package freight the railroad had to handle in Chicago at this time was handled at this place.

In 1849 this building was enlarged and a portion of it was set aside for freight, while the original east end was still used for passengers. The second story was added to the structure and that was surmounted with a sort of observatory. The second story was used by the officers of the road as its general office and in it John D. Turner, the president of the road and his associates planned the extension of the road and controlled its destiny. West of the station was what was substantially an open prairie and from the observatory Mr. Turner often watched for the incoming of his trains with the aid of a long old fash-

ioned marine telescope that he possessed and thus could announce the coming of a train while it was yet as far away as Austin, 6 miles. In those days the use of the telegraph was not even dreamed of on any western railroad.

In 1851 the Galena & Chicago Union Railroad began to purchase station ground east of the north branch of the Chicago River and in 1852 and 1853 built a pontoon or floating bridge across the river on practically the same ground where the Chicago & Northwestern Railway bridge now stands. In those days a street ran along and not far north of the main

other story and in the room so made a portion of the general offices of the company were located. This building remained in use until destroyed by the Chicago fire in 1871.

The third station scarcely deserves to be named but to make this history full it must be referred to. In 1851 this road bought land east of the north branch of the Chicago River and on part of this purchase, erected on the east side of North Dearborn Street and south of Kinzie Street a two story building, the lower story of which was intended for freight purposes, while in the upper rooms some of the Gen-



WELLS STREET STATION.
Destroyed in the Great Fire, October, 1871.

Chicago River and was named North Water Street. The second passenger station was built in 1852 and 1853, east and west along this North Water Street with its east end on Wells Street. It was built of brick and was two stories high. The passenger entrance was from Wells Street but a sort of private alley or perhaps a vacant lot ran south from Kinzie Street and this was used to reach the station through the baggage room.

After the building had been occupied for some time Wells Street was filled in and raised about eight feet, and this caused the Galena Company to add an-

eral Officers of the road were to have their offices. For some time, but for reasons now not known, the passenger trains of the Galena Road ran to and from this building and while this was done neither of the first or second depots were used. The records of the company that were burned in the great fire of 1871 doubtless contained a full explanation of these facts. That this building was used as the road's passenger station is established beyond any question.

The next passenger station of the Chicago & Northwestern Railway, which now had become the successor of the Galena Company, was the one that

was built on the then North Wells Street in the late fall of 1871 to take the place of the one that was burned in the great fire. It was a modern wooden structure and faced south with an entrance from Wells Street.

What is now a portion of the Chicago & Northwestern Railway in Chicago was begun under the corporate name of the Illinois & Wisconsin Railway Company. This afterward by consolidation with the Rock River Valley Union Railroad became the Chicago, St. Paul & Fond du Lac Railroad and that by bankruptcy and reorganization became the Chicago & Northwestern Railway. This railroad while under the second of the corporate titles built in 1854 and occupied a passenger station in Chicago. It stood with its gable end to Kinzie Street and its greatest length west of and quite close to and parallel with the north branch of the Chicago River. It was quite a pretentious structure of wood and had a large train shed that was shut off from Kinzie Street by

slatted gates. After the Chicago & Milwaukee and the Milwaukee & Chicago Railroads were consolidated and ultimately those, together with the Galena & Chicago Union Railroad became the present Chicago & Northwestern Railway. This building was known as the Kinzie Street depot and was used until it was abandoned on the occupation of the present Wells Street station in 1882.

The next passenger building of the road is the present structure that stands on the corner of Wells and Kinzie Streets on the site of the old Galena depot. The planning of this building was for that time on broad lines and was thought would anticipate the requirements far into the future. It was to be the largest and finest passenger station in Chicago built on the headhouse type with a shed covering the tracks. It was begun in 1880 and occupied in 1882.

The building was planned a few years too early to show in its general effect much result of the architectural awakening, which about this time began to



WELLS STREET STATION.
Main portion finished in 1882, Annex 1902.

gain strength and which has since gone steadily forward. About this time the railways having conquered in the struggle for existence and slackened somewhat their expansion into new territory; some portions of an available surplus was used in many kinds of improvements, notably the right of way, suburban and way stations and their surroundings. And now corporations and the people generally recognize the fact that beauty has actual value. In a comparatively few years the rapid growth of this city and the more rapid development of the great Northwest country, this railway system, always in the vanguard of progress, found the Wells Street station too small and the property lying between it and the river was purchased and preliminary studies prepared for a great terminal and office building. This study of the problem developed numerous limitations of the site, the north branch of the Chicago River being no small factor. This and the new conditions due to the general elevation of the railroad tracks from 12 to 15 feet above the street level led to search for a new site and to meet the temporary requirements the annex to the Wells Street station was built and occupied in 1902. As the result of the search for an adequate site, the railway company undertook the gigantic task of acquiring by purchase practically four city blocks in the heart of Chicago for a terminal building, train shed and power house, and in addition to this, the purchase of a new right of way wide enough for four tracks for each of the two divisions extending both west and north about one mile, thus securing for the passenger service of the road a complete elevated

system eight tracks wide into the center of the city, eliminating all dangers and delays due to freight obstructions, grade crossings and open bridges. The last piece of the property was secured and the work of building commenced in the fall of 1908.

The Terminal building proper will be of granite and front on Madison Street, will be used for station purposes only, and will occupy the greater portion of the city block bounded by Madison, Canal and Clinton Streets, extending north nearly to Washington Boulevard.

The track floor covered by the train shed is approximately 18 feet above the general street level. The tracks approaching the station therefore pass over Lake, Randolph Streets and Washington Boulevard and the trains are screened from view from the street by curtained walls about 48 feet high, extending from the main building north on Clinton and Canal Streets as far as Lake Street with special treatment where passing over the street and Washington Boulevard.

The high shed, so objectionable from many points of view, both external and internal, has been abandoned and a low form of shed substituted covering entire space excepting for openings directly above the locomotive stack so that all smoke and gas are exhausted directly into the open air above the shed. The shed will contain sixteen tracks, each with a capacity of 13 Pullman coaches or 16 day coaches. This terminal will have ample facilities for handling 250,000 passengers daily.



C. & N. W. RY. CO.'S TERMINAL. NOW BUILDING. MADISON, CANAL AND CLINTON STREETS.

Chicago Freight Subways

By ALBERT G. WHEELER

CHICAGO was incorporated as a city at the time of the earliest development of steam railroads in the United States for transportation. Its importance was fully realized by the earlier pioneers in transportation, as all steam railroads in this section of the country either started or terminated at this point.

At that time, the city being young, these transportation lines acquired property for their terminals in what has since turned out to be the heart of the city and today in an area of two miles square in the center of the city the important freight yards of railroads, representing over forty-seven per cent of the entire mileage of the United States, are located.

The rapid growth of the city South, West and North so encircled these freight yards that as the Western country developed the railroads found that the city had grown so much faster it was impossible to acquire more property in its business center and the value of this real estate they had acquired made these freight terminals the highest priced real estate occupied by freight yards in the world.

To relieve this situation and to enable the railroads to increase their facilities for handling freight in the future without acquiring additional property in this business center, the tunnels of the Illinois Tunnel Company were constructed.

To lay out a system of tunnels to make delivery in any and every building in this business center, several important points had to be considered:—

1st. That such tunnel system should not require the remodelling of buildings to put it in operation;

2nd. That the tunnels, when constructed, should permit curves at all street intersections to be built and not necessitate building under private property to get the proper radius for such curves;

3rd. To prevent congestion in the tunnels, no freight should be loaded or unloaded in them;

4th. That increased traffic could not congest the tunnels.

To carry out plan No. 1, it was necessary to establish a car unit, that any car could be hoisted to any floor of any building without overloading the floor or necessitating strengthening the building, and that the size of the car when established could handle any size package that would pass through a railroad car door.

No. 2. The size of the car established, the tunnel need not be any larger than to accommodate the car, and with a small tunnel curves could be made at street intersections in the streets and thus avoid going under private property. Also with a small tunnel, sidings could be built in each block to hold cars of the shippers without blocking the main track.

3rd. Had the tunnel been built larger and the cars too large to enter the buildings, it would have been necessary to load and unload cars in the tunnels and the tunnels would have been blocked up at all such points during the time.

No. 4. All cars being switched on side tracks or being elevated in the buildings keeps the main track open and no congestion occurs in the tunnels.

Twenty miles of tunnels were completed in 1904 and the Company purchased a terminal property at West Taylor Street and the Chicago river, intending to put it in operation early in 1905, when parties largely in control of the railroads entering Chicago were attracted to it and business arrangements were made with such parties to fully develop the property and make it more of a railroad terminal before it was put in operation. The Company had secured the mail contract from the Government, which was operated to show the tunnels' efficiency. This contract required a close schedule as to time of delivery between the railroads and the postoffice. Its service required one thousand train movements a day and heavy fines for failures to make deliveries on time. During the last year of this contract the service was operated 99.98 per cent perfect, an unknown high rate of service, and fully demonstrated the practicality of the capacity of the tunnels as well as the low cost of operation which justified carrying out the future plans of extension of the property. When the

contract expired with the Government the price was so low that the Company felt it should be compensated for such service to the extent of at least one dollar per train load, but the Government was not willing to pay this, and as a car movement of one thousand trains each day for other freight was so much more, the Company could not continue the service.

The new interests in the property fully convinced and satisfied from the operation of the mail service that the size of the car and the size of the tunnel were correct, laid out plans increasing the scope of the tunnels to reach all points in the railroad freight yards and to complete its transportation before it was put in full operation. This necessitated building forty-two miles additional of tunnels, requiring fully three years. At the time of completion of the sixty-two miles of tunnels, before the property had been put in full operation, the death of one of the principal owners of the property caused a change in the Company's plans, necessitating a reorganization of the property. The large parties in interest holding the Company's securities have agreed to such plans and when carried out the Company will be prepared to operate the property on the broad scope for which it was built.

The tunnels of this Company and the purpose for which they were built has been little understood by the people of Chicago. To realize the importance of them as to the future of Chicago, they must be looked upon as a railroad terminal. The growth of the great railroad transportation systems entering Chicago necessitates provision for future terminals here, and the fact that the railroads own practically all the real estate they can acquire in the center of the city, forces their increased facilities for handling freight to be moved several miles from the city's business center where they can acquire land at fifty cents to one dollar per square foot as against twelve dollars

to thirty dollars per square foot in the center of the city. To establish such new freight yards means that the railroads should have them connected with the center of the city. To extend the tunnels of this Company to such new yards is not to increase the cost of delivery or receiving goods to any extent, as the haul through the tunnels, whether one mile or seven, is an unimportant matter. When such improvements are made by the railroads it will greatly reduce the number of locomotives entering the city and therefore greatly reduce the smoke made by them.

When the full idea for which these tunnels were planned is carried out, from a public standpoint it will prove to be as beneficial to the public's interest as any public improvement ever made.

To undertake to operate this as an independent property is to dwarf its real use to the community and make it only an ordinary success. To make it a railroad freight terminal is to make it the greatest freight terminal property in the United States.

Terminals for railroads are as important as any part of a railroad system. The great earnings of the railroads are produced from freight, in many cases the passenger traffic being operated with very small profits: yet the terminals for passenger traffic were important enough for the New York Central lines and the Pennsylvania lines to each expend over one hundred million dollars in New York City for passenger terminals, while here in Chicago, the Chicago and Northwestern Railway is building a terminal for passengers at an enormous cost.

When one realizes and compares in the way of earnings of freight to passenger traffic of the steam railroads, and that it is necessary to make such expenditures for passenger terminals, then one can better appreciate the great importance of the Chicago Subway Company's great freight terminal for the many railroads terminating in Chicago.



Subway's Telephone Department

By ALBERT G. WHEELER

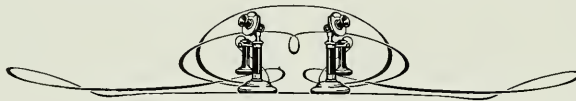
THE originators of this SUBWAY construction believed that the telephone was becoming more everyday the main method of transacting business, and business men were compelled to transact their business through the telephone in the hearing of their own private switch-board operators as well as of those of the several switch-board operators of the Telephone Exchange Company. They realized that business men do not want to transact business in the hearing of employees or disinterested parties, but were compelled to by existing circumstances. To improve on these conditions they decided to have their Telephone Department equipped with devices to prevent anyone breaking in on, or overhearing any conversation over the telephone. To this end the Automatic Telephone devices were perfected.

The first equipment of its Telephone Department provided for an exchange giving service to 10,000 subscribers. It was installed with a view of completing an extensive telephone plant to cover the whole city. The Company's plan at the time of the installation of the exchange was to have its trans-

portation department in operation in 1905 and then proceed to complete its Telephone Department, but as stated, at this time a change of ownership and policy compelled it to develop its transportation department on such a broad scope that the telephone plans had to be deferred until its traffic department had been completed.

Fortunately this delay will prove of great value to the subscribers of this Company, for, in the meantime over one hundred cities have equipped their exchanges with these Automatic devices which have proved very successful and to the entire satisfaction of their subscribers. This Company can now install its new plant with all of the Automatic improvements up to date, giving its subscribers the most modern and improved telephone system installed in any city in the world.

The Company's plan of reorganization includes the immediate installation of a comprehensive telephone exchange, the first section of which will provide for 20,000 subscribers having connection through long-distance service with the whole adjacent country to Chicago.



The Bascule Bridge in Chicago

By J. B. STRAUSS, C. E.

CHICAGO is, among other things, a city of bridges. Perhaps nowhere in the United States is there a larger number and variety of bridge structures and there certainly is no single city where these structures play a more important or conspicuous part in the city's every day existence. In Chicago all the main arteries of communication in the city proper, are cut through by the Chicago River and its two branches and in the outlying districts, the Calumet River, the Drainage Canal and its feeders, together with the minor streams and canals, present multiplied opportunities for bridge construction of every kind and degree.

With but few exceptions, Chicago bridges are movable and despite the heavy traffic on both land and water, these movable bridges serve the community so well that the effect of the withdrawal, during the past few years, of the three old tunnels from service has been scarcely, if at all, noticeable. Without attempting to enter into a discussion of the relative merits of tunnels and draw bridges, this experience clearly indicates the sufficiency of the above-surface methods of transit for heavy traffic, and throws some doubt upon the wisdom of general sub-surface transportation.

Up to the years 1893 or 1894 all the movable bridges of Chicago were the ordinary type of draw or swing bridges, the earlier structures being combination wood and iron, and the latter steel. Some of the former are still in service on the South and North branches and a considerable number of the latter are also in use at the principal crossings of the main river. There were also two or three deviations from the draw bridge, such as the folding lift bridges at Weed and Canal Streets over the North Branch and the vertical lift bridge over the South Branch, representing the first halting steps towards the supremacy of Chicago in the practice and use of the modern bascule bridge.

At the present time Chicago is the acknowledged bascule center of the world; it is here that this type of movable bridges has reached its greatest development; with but few exceptions, all the recent designs originated or were recreated or exploited here and

almost all the bascule patentees and going bascule bridge companies are located in Chicago. The most successful work in this field has been conceived and executed in Chicago and the largest number of these bridges in any one spot is found within its environs.

The term "bascule" is derived from the French, and specifically means a rocking bridge. It has, however, been extended to cover all types of bridges moving in a vertical plane, and about a center, being thus distinguished from the bridge which is simply hoisted up bodily and which is designated as a lift or hoist bridge. The vertical lift over the South Branch or the Halsted Street bridge already referred to, is an example of the latter. Contrary to general opinion, this particular design is not a novelty in bridge construction, except in that the size of span and height of lift are greater than in other bridges of this type. The lift bridge is not a bascule and is not comparable to the bascule, as is evidenced by the amazing rapidity with which the latter has multiplied since the completion of the Halsted Street bridge in 1893, while the lift bridge still counts but very few structures of any size.

The first of the modern types of bascule bridge in this country was built for the Metropolitan West Side Elevated R. R. near Van Buren Street, Chicago, in 1894. It was designed by William Scherzer, then engineer for the Metropolitan Elevated, and was patterned after a small bridge of the same general type built at Havre, France. A second bridge was built at Van Buren Street in 1895 and a third at North Halsted Street in 1897, both constructed for the City of Chicago. William Scherzer died before the completion of the Metropolitan bridge and this design remained simply the occasional design for special conditions until Albert Scherzer undertook its commercial development under the name of the Scherzer Rolling Lift Bridge Co., but the Van Buren and North Halsted Street bridges are still the only Scherzer bridges used by the municipality of Chicago.

The greatest impulse to the Scherzer bridge and to the bascule bridge in general was given by its adoption by the Sanitary District of Chicago, in

pursuance of a policy adopted in connection with the water flow and calling for the elimination of center pier bridges. In all ten Scherzer bridges, constituting, with the exception of the three above mentioned, the full total in the city of Chicago, were built under the direction of the Sanitary District and subsequently turned over by it to the City of Chicago to be maintained and operated. From its inception and up to 1902 the Scherzer Bridge Co. occupied the field entirely alone and with the impetus given by the Sanitary District, succeeded in introducing its bridges at numerous other points. In 1902, however, the first hint of future competition came in the construction of the Page bridge at Ashland Avenue, also a result of the policy of the Sanitary District, and in 1906 a second Page bridge, this time ordered by the C. & A. R. R., was built for this company over the South Fork of the South Branch of the Chicago River, near Archer Avenue. The Page bridge is unlike the Scherzer, an original design, the particular aim of the inventor being the elimination of the deep pits required in the usual form of the Scherzer highway bridge.

A small bridge designed by William Rall, of Chicago, was built at Delphos, Ohio, in 1901. The right for this type has since been acquired by the Strobel Steel Construction Co., and three bridges have been built by this company for the Pennsylvania, the Baltimore & Ohio and the Lake Shore & Michigan Southern Rys. jointly where their lines parallel each other in the crossing of the East Chicago Canal at Indiana Harbor, a few miles from Chicago. The canal is not in service as yet and the bridges therefore are not operative. The design is a different and distinct type from any of the other Chicago bridges and is a development of a design originated by W. L. Worden, of Milwaukee, in 1895, but never reduced by him to practice.

The Chicago design of trunnion bascule bridges first became a reality in the Clybourn Place bridge built in 1902. The design is an adaptation of the standard trunnion bridge of Europe to American practice and Chicago conditions, and so well has the work been done by the Chicago Bridge Department that this type has been adopted, in more or less modified form, by the cities of Milwaukee, Philadelphia and others, as well as by the District of Columbia and by the State of New York in con-

nection with its Barge Canal. About nine bridges of that type in all have been constructed in Chicago to date.

In 1905 the Strauss Trunnion Bascule Bridge, following its successful construction and operation in a half dozen other cities, was adopted by the Chicago & Northwestern R. R. for its crossing of the North Branch of the Chicago River near Kinzie Street.

A second bridge of this type is under construction at Polk Street for the city of Chicago, being the first deviation of the city authorities from the city type of trunnion bridge. The Chicago & Northwestern bridge holds the record for the longest double track single leaf bascule bridge in the world and the most heavily trafficked and frequently operated, but it will be exceeded by the Strauss bridge now under construction for the C. & W. I. R. R. across the Grand Calumet River.

The above five types represent practically all those which have passed beyond the stage of a single initial installation, so that we have here in Chicago examples of every design which has experienced commercial development. And it is in Chicago therefore that the true rating and standing of these types will be determined. The highway bridges whether built by the city or the sanitary district, are all operated and maintained by the city, and the bridge department has put into practice an excellent system of performance and maintenance records, covering the different types, which records are proving of incalculable value, in arriving at an accurate idea of their efficiency.

From these records it has become evident that bascule bridges naturally fall into two groups, namely, those with rolling contacts and those without. The trunnion bridge, which include the City Trunnion and the Strauss Trunnion, belong to the latter group; the remaining three types belong to the rolling contact group. The rolling contact bridges have given evidence of elemental weakness in the tracks and threads which in two or three structures have resulted in fracture, throwing grave doubt upon the suitability of the rolling contact principle for such usage. On the other hand, the trunnion has proven here as it has during a period of fifty years or so in Europe, that it is a highly efficient and absolutely reliable device under all conditions of service and for all limits of size and weight.



TYPE OF STRAUSS BASCULE BRIDGE OVER CHICAGO RIVER.

At the present time Chicago faces the necessity for further advance in bascule bridge design in connection with the proposed increase in the clear width of channel in the main river. The existing bascules provide a clear waterway of 140 feet between fender lines, cutting off approximately 60 feet of the river width because of the projecting abutments. The new harbor commissioner appointed by the mayor to improve and develop the harbor and river and which commission is headed by John M. Ewen as harbor engineer, has recommended a clear channel width equal to the full width of the river or approximately 200 feet, and it seems more than likely that the future bascule bridges of Chicago will be required to provide this clear width.

Since the building line in almost all cases extends to the dock, and since the dock will be the new fender line, it becomes rather a knotty problem to

develop a design which shall not encroach on either, or interfere with the full utility of the river or the value of abutting property. The present depth of counterweight pit is also close to the maximum limit and it will be necessary for the new design to exceed this limit but little. Last but not least, the cost must not amount much above the cost of the present city standard, all of which means a bascule bridge of still greater efficiency and greater capacity, and it is safe, therefore, to expect still further Chicago contributions to the bridge builder's art in the future than have been given in the past.

What the Chicago engineers have already accomplished is the firm establishment of the bascule, throughout the world, as the most advanced type of movable bridge, and in so doing they have contributed in no small degree to the present remarkable development of our internal waterways.

Chicago's Water Supply System

By JOHN E. ERICSSON

Introduction

IN the transition of the world from chaos to cosmos water formed one of the early stages, and ever since the formation of the organic world it has been one of the essential necessities for progress and development.

The life of the little unobserved herb in the crevice on the mountain side is as dependent thereon as is man, the crowning glory of God's creation.

After performing its life giving functions to animal life, it is taken into the earth and is passed by natural forces to the arteries of all organic growth or percolates to the streams or oceans that float the commerce between nations.

Straggling veins extract the medicinal qualities from organic substance or dissolve equally valuable elements from inorganic matter and emerge as springs to relieve the ailments of afflicted man.

All unseen it ascends to the clouds in its invisible purity and descends, scouring, cleansing and absorbing the impurities in the air we breathe, ready to repeat indefinitely the cycle of its functions.

Ever since man came upon earth his life and happiness have depended on a sufficient and pure supply of water.

The lonely settler, whose cabin was located by the everlasting spring or brook, had no necessity for any mechanical device for the collection or storage of the commodity, but as the race increased and people commenced to live in communities, smaller or larger, the earliest method of artificially obtaining a water supply was undoubtedly by the digging of wells.

As communities grew larger, many collected the water through aqueducts, some several miles in length, to cisterns and reservoirs, where the inhabitants secured their supply and carried it to their homes.

Among such ancient constructions the Aqua Appia of Rome, built about 312 B. C. and which had a length of eleven miles, may be mentioned.

The development of modern water works in Europe was slow, up to the eighteenth and nineteenth

centuries, and was confined principally to London and Paris.

With the application of steam to the pumping of water, a great impetus was given to the development of water works constructions.

In the United States the progress in the development of such works, especially in the improvements in the making of cast iron pipe and the perfection of pumping machinery, has been marked since 1850. Today there is not a city, and hardly a village of some two thousand inhabitants, that has not its own water supply system.

Early Development of the Water Supply System of Chicago

The town of Chicago was incorporated in 1833 and the city of Chicago in 1837. In those early days the little group of citizens with their homes located on the shore of one of the largest natural fresh water reservoirs in the world, and not being used to the luxury of having the supply delivered by gravity or machinery through pipes into their homes, gave but little thought to water works development, securing their supply in buckets and barrels as it was needed, from wells, river or lake.

An enterprising corporation, the Chicago Hydraulic Company, however, came into existence in 1836. By the construction of a reservoir at Lake Street and Michigan Avenue the supply was brought nearer to the homes of the citizens, and a part of the new city obtained its supply therefrom. It was not until 1840, however, that a pumping engine was constructed, and thereafter the water was brought still nearer to the consumers through bored out logs, of which two miles were then laid. The supply was obtained from Lake Michigan through an iron pipe running out into the lake about 150 feet.

The young city grew rapidly in population, the services rendered by the private water company were unsatisfactory, and in 1851, by legislative act, the city was given power to establish its own water works, and the franchise of the Chicago Hydraulic Company were taken over by the city.

From this time a new era in the development of water supply system of Chicago was initiated.

The Beginning of the Half Century

With these preliminary remarks, we will take a glance at the system at the termination of the year 1858, or the beginning of the semi-centennial period, which is the object of this sketch.

Chicago had now grown to be a city with about 100,000 inhabitants. Its people were supplied with water by means of two pumping engines and four boilers, located in a pumping station at the foot of Chicago Avenue near the lake; the supply being obtained through a 30 inch wooden pipe reaching about 600 feet out into the lake.

The total nominal capacity of the plant was 21,000,000 gallons per 24 hours and the average daily pumpage in 1859 was at the rate of 3,877,119 gallons per 24 hours. The water was distributed through 72 miles of mains with which 272 fire hydrants were connected. The area of the city at that time was about 18 square miles, and the daily consumption of water per capita was only about 39 gallons.

Contamination of the Supply

While the capacity of the new pumping station with the low per capita consumption was more than ample for some years, the rapid increase in population of the city, its increasing commerce and trade, and the construction of miles of sewers which discharged their foul contents into the waters of the lake and river, brought about a condition as regards purity of the water supply that soon became well nigh unbearable, and made Chicago a butt for jokes all over the country.

The Chicago River, ordinarily more like a currentless bayou, became a cesspool of filth, which the spring floods carried out into the lake, contaminating its water for a considerable area and rendering the water supply extremely impure. Small fish that sought the shallow water near the shore were drawn into the water intake pipe, and after passing through the pumps were disseminated through the water pipes of the city.

Owing to the War, which absorbed the attention of engineers and others all over the country, this state of affairs was endured until 1863, when the

limit of endurance was reached, and the citizens began to show a determination to have the conditions changed.

Many schemes were proposed to purify the Chicago River, all more or less extreme and impractical. Even at this early date the suggestion to construct a series of intercepting sewers was made, but the expense and the time required would be so great and the entire matter so much of an experiment that the scheme was abandoned.

The Ship Canal idea was also under consideration, but a bill introduced in Congress for this purpose was killed, and deprived the citizens of Chicago of all hope of relief in that manner.

With an inexhaustible reservoir of pure water located at their outer door, requiring only some means whereby the crystal fluid could be brought from a sufficient distance from shore, the authorities were bordering on a state of desperation.

The First Water Tunnel

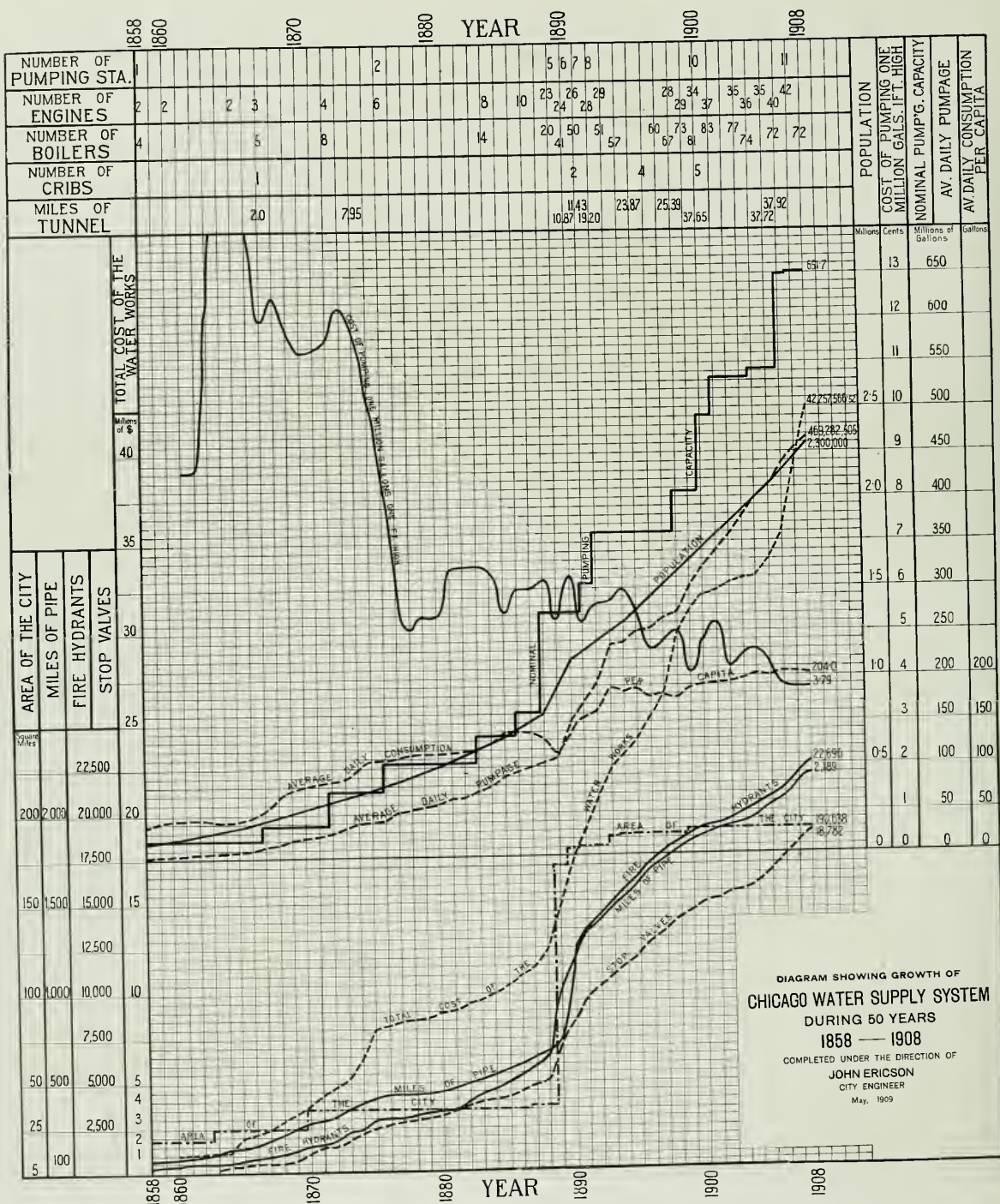
The idea of constructing a tunnel under the bed of the lake, which was now brought forward, was a new one and was by many engineers declared impracticable.

To the forethought, skill and determination of the City Engineer at that time, Mr. E. S. Chesbrough, is due the adoption and consummation of this idea of securing for the coming metropolis an improved water supply, which method has since added so much to the growth, health and happiness of the city, and made the later problems of extensions comparatively easy. This first lake tunnel, five feet in internal diameter and two miles long, was completed in 1867, and the water supply problem was solved for the time being.

The increase in area of the city through annexation of adjoining territory and the rapid increase in population soon brought up another problem as regards the water supply situation.

The pumping station located at the lake on the eastern margin of the city could not deliver sufficient water at the required pressure to distant inland portions of the city, and it became apparent that a pumping station must be located and constructed so as to provide an effective service to those districts. The successful completion and operation of the first tun-

A HALF CENTURY OF CHICAGO BUILDING





CARTER H. HARRISON CRIB.



Commenced 1887.

FOUR-MILE CRIB, CITY OF CHICAGO.

Completed 1894.

nel solved the engineering problem of delivering water by gravity to such an inland pumping station. If funds were available, the construction of tunnels of any length could now be undertaken without apprehension as to the success of such a venture.

A new seven foot tunnel, extending from the Chicago Avenue pumping station, in a northeasterly direction under the lake to the original crib and extended across the city to a new pumping station located about four miles southwest of Chicago Avenue station at Twenty-second Street and Ashland Avenue, was completed, and two new pumping engines of a capacity of 15,000,000 gallons each put into operation in 1876. In the meantime, an additional pumping engine with a capacity of 36,000,000 gallons per 24 hours had been installed at the Chicago Avenue pumping station and put in operation in 1872.

Thus the second important step in the development of the water supply system had been conceived and successfully executed.

These two stations, by the addition of some new pumping engines, served the city for about a decade, when it became apparent that the demand for water was rapidly approaching the existing tunnel capacity and that new tunnels and additional pumping stations must be constructed.

The new additional system which was commenced in 1887 embraces the Harrison Street and the Fourteenth Street pumping stations and the tunnels connecting said stations with the Four Mile Crib. A part of this system consists of tunnels eight feet in internal diameter. This system, which added 90 million gallons per day to the nominal pumping capacity, was ready for operation in 1890 and 1891. In the meantime large areas were added to the city by the annexation of the towns of Lake View, Hyde Park and Lake in 1889.

Complications as Regards the Water Supply System

Each one of these annexed communities had water supply systems of their own, but they, of course, formed no part of the original Chicago system, but were entirely detached and independent. Each system also needed immediate improvements and extensions, and some scheme for the unification of the various systems soon appeared to be a necessity. New

pumping stations with additional machinery were almost immediately planned for Lake View and Hyde Park.

In 1890 the Washington Heights district and in 1893 Norwood Park were added, both of which had to be given immediate attention in the way of water supply improvements, including new water tunnels for other stations.

Meanwhile other territory was added to the western and the northern part of the city, the population increased at a phenomenal rate, and the cry for more water went up from nearly all the outlying districts.

Another large system of tunnels and pumping stations was, therefore, planned. This system embraces the Central Park Avenue and the Springfield Avenue pumping stations with a capacity of 100 million gallons per 24 hours each, together with the system of tunnels which terminate at the Carter H. Harrison Crib. This system was put in operation in 1900 and 1901. The total pumping capacity at each of these stations was, however, not reached until some years later.

The city now had ten pumping stations widely separated, and in order to obtain as elastic a system as possible it was deemed necessary to inter-connect the various systems with large mains. This work was commenced in 1898, when some 50 miles of these main arteries were laid. This work has since been continued until the entire water supply system of Chicago today represents a fairly well connected whole.

Diversion of Sewage

As the length to which Lake tunnels can be built is limited by the increasing depth of water at greater distances from shore, some means of preserving the purity of the water supply within tunnel limits became necessary. This resulted in the construction of the great Drainage Canal to reverse the direction of flow in the Chicago River, and the Intercepting Sewer Systems to divert the discharge of sewage from the lake to the Drainage Canal, at a cost of some 60 million dollars.

A satisfactory supply as regards quality of water was thus obtained, but, although only a decade has passed since the opening of this great drainage system, serious problems regarding the preservation of the purity of the water supply again confront us in

the general use of the lake for disposal of wastes by cities along its shores, and much work and great expenditures will be necessary in the immediate future to otherwise dispose of this contaminating material, and later for the adoption of some method of sewage purification.

Additions Now Under Construction

There is under construction at the present time another addition to the water supply system in the southern part of the city, which when fully completed will include about 11 miles of tunnels and three pumping stations, the lake portion of tunnel having an internal diameter of 14 feet. One of these pumping stations is now under construction.

The System Today

A large addition to the Lake View pumping station is also under construction and about completed.

The water system of Chicago today consists of 11 pumping stations in operation, containing 42 large pumping engines and 72 boilers. There are 38 miles of water tunnels and five intake cribs in use, and about 16 miles of tunnels under construction. There are 2,189 miles of water mains with 18,782 stop valves and 22,696 fire hydrants. The area of the city is 190.64 square miles.

Concluding Remarks

The above brief description will give some idea of the progress and development of the water supply system during the past 50 years. The table and diagram accompanying this article will more satisfactorily show its successive growth. Its rapid growth has truly been phenomenal, and yet has hardly fully met all the requirements at any time.

Not only has the population of this city increased at a rate that stands alone in the history of the world,



SPRINGFIELD AVENUE PUMPING STATION.

but the increase in the consumption of water per capita per day has also been so great that if these increases are allowed to continue at the same rate in the future pumping stations will be as numerous as school houses and the lake bottom will be honey-combed with tunnels.

While the population in 50 years has increased from 100,000 to 2,500,000, the pumpage has increased from 39 gallons per inhabitant to 204 gallons per inhabitant per day.

A recent analysis made of the water supply situation in the business district of the city indicates clearly that the requirements for water in this district will at least be quadrupled in about 30 years, even if the per capita consumption can by energetic methods be brought down to about one-half of what it is at present, it having been well demonstrated that a great percentage of the water pumped is lost through leakage and waste.

The writer some years ago after some examination asserted that about 75 per cent of the water pumped is lost through leakage and waste. As a result of this preliminary investigation a system of water surveys was inaugurated in 1907 for the purpose of discovering and checking this enormous waste. The following brief description of the results of this work fully bear out the conclusions formerly arrived at.

The water consumption of the city of Chicago increased from 126 gallons per capita in 1890 to 204 gallons per capita per day in 1907, when the total pumpage was 450,000,000 gallons per day.

The Water Survey Division, organized for the purpose of decreasing the waste and leakage, surveyed ten square miles of the central portion of the city. The results of these surveys show that there is a heavy plumbing leakage throughout the city, which is due to the neglect of owners and tenants in making repairs, and which causes a loss of from 35 to 45 per cent of the total supply. In one square mile on the west side, bounded by Madison Street, 12th Street, Halsted Street and Ashland Avenue, a total saving of 5,700,000 gallons per day, or 48 per cent of the supply, was effected by repairing faulty plumbing fixtures.

In addition to the plumbing waste, there is an excessive underground leakage, due to defective street mains and old service pipes, principally the latter;

which waste from 25 to 35 per cent of the total supply. In Districts Nos. 21, 22 and 23, having a combined area of 750 acres and located between 31st Street, Princeton Avenue and the Chicago River, the underground leakage was found to be approximately 2,850,000 gallons per day, or $47\frac{1}{2}$ per cent of the total supply.

These are the principal sources of loss of water. There are other forms of losses, however, that affect the total supply, and which amount to a total of from 5 to 10 per cent of the supply.

About 35 districts, ranging from 75 to 300 acres, have been surveyed, which show high night rates of consumption, indicating neglectful waste and underground leakage. The total loss amounts to from 70 to 80 per cent of the total supply. The net consumption in the districts where house to house inspections were made show that from 40 to 60 gallons per capita is ample for domestic consumption, and in some districts it is as low as 30 gallons per capita.

The average daily pumpage for 1908 was 467,000,000 gallons per day. Fifteen per cent of this supply was metered. The total number of metered services in Chicago is less than 5 per cent. At the present time the city receives less than two cents per 1000 gallons for the unmetered supply, which is less than actual cost to the city. More meters are necessary to restrict the wilful waste common everywhere. The increase in revenue or decrease in cost of plant and operation from the general use of meters would insure the city large returns on the investment.

A total of 14,000,000 gallons per day was saved during the past nine months by district surveys. Most of this water was saved by eliminating the plumbing leakage. This volume of water at 2.9 cents per 1000 gallons amounted to a saving of \$148,000 per annum.

While some of the above may not be considered as belonging to a pleasant history of "A Half Century of Chicago's Water Supply System," the writer thinks he should not neglect this opportunity of bringing home to the Chicago readers of this article the fact that a serious condition confronts us, and that there should be no let up in the planning and construction of additions to this system, as well as to a restriction of the waste.

The Chicago Harbor

By JOHN M. EWEN

SPECIAL HARBOR COMMISSIONER OF THE CITY OF CHICAGO

WATER transportation has played a much larger part in the development of Chicago than most persons realize. While the importance of water traffic for Chicago has seemed to be ebbing during the past decade, I believe a revival is in sight and that water transportation in the future is to contribute more to the progress of Chicago and the community tributary to it even than it has in the past.

Chicago, Buffalo and Duluth occupy the three positions of greatest strategic advantage with reference to water transportation upon the Great Lakes. Buffalo stands at the point of transfer between the Great Lakes and the canal and rail lines to the East. Duluth, besides being at the northwest terminus of water transportation, is surrounded by immense deposits of iron ore. Chicago, located at the foot of Lake Michigan, is possessed of a far richer hinterland than Duluth can ever expect to have. It has exceptional opportunities as a distributing and manufacturing center. The region about Chicago is in agricultural resources one of the richest in the world. Abundant coal supplies are not far away and the iron ore of the Lake Superior region can be brought to this area so cheaply by water transportation as to make Chicago the natural meeting place for the coal and the iron ore.

With the development of the Erie canal Chicago became the western terminus of water transportation. It thus became the greatest grain shipping center of the West. The presence of immense timber supplies in Michigan, Wisconsin, Minnesota and Canada adjacent to the Great Lakes made possible the utilization of water transportation for lumber. It was because of its location that Chicago became the greatest lumber center in the world and the bringing in of lumber in large quantities naturally contributed to the development of manufacturing in lines in which lumber is the principal raw material.

It was the commerce and industry developed by location on the water which made Chicago the Mecca for the railroads so that today this city is the

greatest railroad center in the world. Chicago's supremacy as a railroad center, in other words, is indirectly due to its earlier supremacy as a water transportation center.

Even the despised Illinois and Michigan canal—the "tadpole ditch"—has played in the past a more important part than is commonly realized. This canal in earlier days carried a large volume of traffic and was an important factor in maintaining low railroad rates to and from Chicago.

When the Lakes-to-the-Gulf Waterway shall have been completed and when the improved water routes from the Great Lakes to the Atlantic Ocean shall be a reality—whether by an enlarged Erie canal, by the St. Lawrence route, or by the proposed Georgian Bay ship canal, or all three—Chicago will be in a position again to profit tremendously by its advantageous location with reference to water transportation.

In order to derive the benefit which is its due, however, Chicago must be prepared to take advantage of the opportunities open to it. This involves tremendous development in the way of harbor and dock improvements.

In the early days of water transportation the craft navigating the Great Lakes and even more those navigating the Illinois and Michigan canal, were small in size. They did not require deep water nor expensive dock facilities. Moderate improvement of the river sufficed to attract to this location tremendous volumes of traffic. The improvements of earlier days were sufficient to the needs of those days.

It is interesting to note that more than forty years ago the authorities were planning elaborate harbor developments. Government engineers in the 60's recommended the building of a harbor on the lake front and in furtherance of that recommendation protecting breakwaters were built. In the controversy and litigation between the public and the Illinois Central railroad over the question as to who should control the proposed harbor, the improvement was blocked. A few docks were built on the lake front,



HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE NORTH BRANCH OF THE CHICAGO RIVER
AT NORTH HALSTED STREET, CHICAGO.
In a partly opened position.



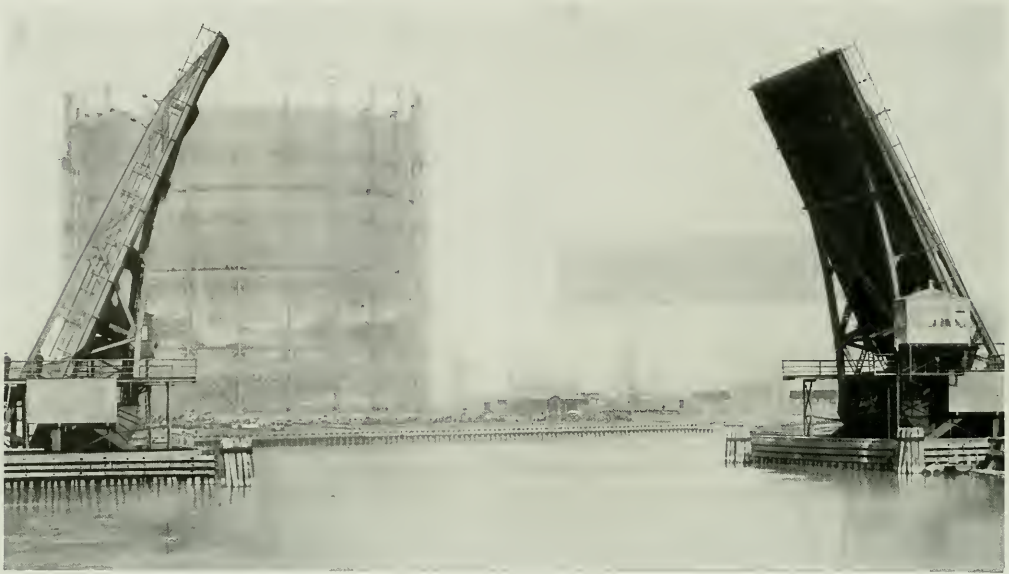
HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE NORTH BRANCH OF THE CHICAGO RIVER
AT NORTH HALSTED STREET, CHICAGO.
In the closed position.



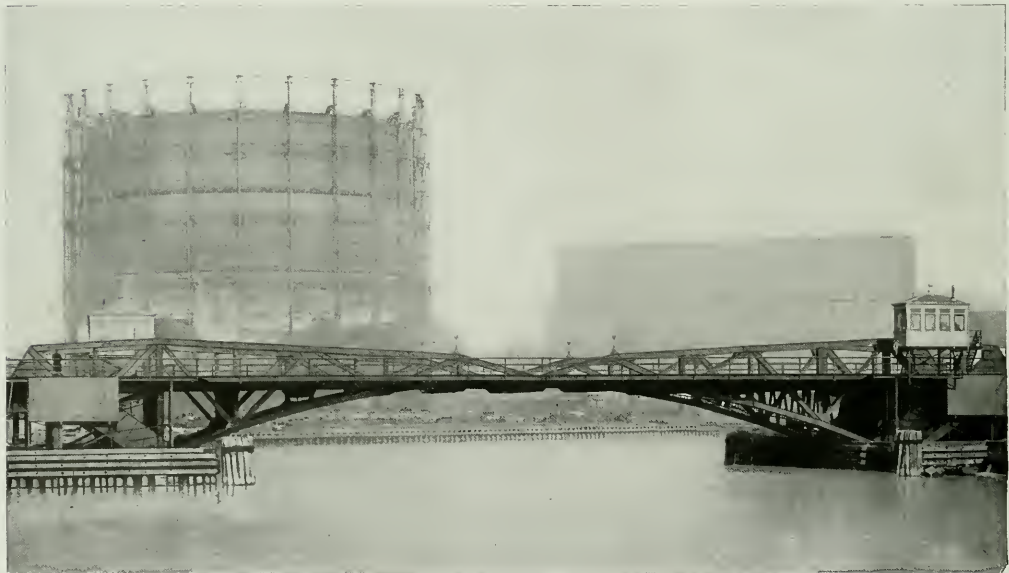
HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT TWENTY-SECOND STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.
In a partly opened position.



HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT TWENTY-SECOND STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.
In the closed position.



HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT MAIN STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.
In the open position.



HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT MAIN STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.
In the closed position.



HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT STATE STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.

View showing bridge in the open position. This bridge is the first bascule bridge on the route of the Deep Waterway from the Great Lakes to the Gulf of Mexico and Panama Canal.



HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT STATE STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.

In the closed position.

but in the main the project of forty years ago has been abandoned and the area in question is now devoted to park purposes.

Chicago in recent years has been losing its lake commerce. Perhaps if the development of earlier years had been carried out as planned the story might have been different. While to some extent the commerce of Chicago has declined because of the natural falling off of the supply of some of the commodities of lake commerce—notably lumber—it is undoubtedly true that better facilities would have meant more water traffic. It is significant that the Chicago river harbor is the only one showing decline of water traffic. The movement of freight on the Great Lakes has increased tremendously in the past decade. Milwaukee, Duluth, Cleveland and Buffalo all show large increase in tonnage. The port of Chicago has just about held its own during the past ten years. Chicago proper shows a large decline. The water traffic for the port as a whole has remained constant because the commerce of South Chicago has increased by about the same amount that that of Chicago proper has fallen off.

There are signs that the city is awakening to the importance of water transportation. The vessel men and the dealers in the few commodities of heavy lake traffic, who heretofore have been waging the battle for river improvements practically alone, are now receiving the support of the public authorities and of public opinion. The appointment by Mayor Busse of the Harbor Commission was one evidence of this reawakening. The Harbor Commission after more than a year of work upon the subject, submitted to the Council on March 1, last, a report recommending a comprehensive plan of harbor development. The city administration and the Council Committee on Harbors, Wharves and Bridges are now dealing with these various recommendations with a view to carrying them into effect as speedily as possible.

The subjects first to receive attention are those of center pier bridges and the developments of docks north of the mouth of the river.

For years the street car tunnels under the river were serious obstacles to navigation, and prevented vessels entering the river loaded to their full capacity. After years of agitation, these obstacles to navigation were removed. The center pier bridges,

however, remained. The agitation for their removal, and the substitution for them of bridges of the bascule type has been carried on for a number of years. Recently some of these old bridges have been taken out and new bridges of the bascule type having a clear span of 140 feet at the water line have been substituted in their place.

The Harbor Commission was of the opinion that the bridges, instead of being 140 feet in the clear, should be 200 feet. The problem confronting the city at this time is, not only to do away with the center pier structures, but to get in their place bridges adequate for the needs of the future. The War Department has already fixed a date within which the bridges at Lake Street and Indiana Street must be removed. The city administration and the Council Committee on Harbors, Wharves and Bridges are now dealing with this matter with a view to making arrangements for the best type of structure that can be devised. Within a few years the policy of harbor improvement should make it possible for the largest vessels navigating the lakes to enter the main river and its branches and traverse them for as great a distance as the interests of shipping call for.

The Harbor Commission, created by resolution of the City Council and appointed by Mayor Busse, was directed primarily to consider the question as to how much of the lake front should be reserved for future harbor uses. The commission was of the opinion that extensive reservations should be made south of Grant Park, but it did not recommend the immediate construction of harbors in that vicinity. Its suggestion was, that the contemplated park improvements for that area be so carried out as to permit of later adaption for harbor uses, if found necessary.

The commission was of the opinion, however, that piers projecting into Lake Michigan north of the mouth of the river should be constructed as speedily as possible. These piers would be intended primarily for the accommodation of passengers and package freight boats. The passenger-carrying vessels are now doing business in the port of Chicago under very great difficulties. It is important that the facilities for these boats be increased. With the construction of a street car line running to the piers the location north of the mouth of the river would be well adapted to passenger boat purposes.



HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT RANDOLPH STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.
Open for navigation.



HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT RANDOLPH STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.
In the closed position.

The package freight boats now have their docks at various places in the Chicago River. Most of them have insufficient room for the proper transaction of their business. New boats that might desire terminal facilities in the port of Chicago, whether for the passenger or package freight business, would find serious difficulty in securing the desired accommodations. With the construction of piers north of the mouth of the river, adequate facilities could be provided for the passenger and package freight boats now doing business in Chicago. This location probably will not provide facilities sufficient for all time to come. But the thing to do now is to provide these facilities as soon as possible, and then take up for consideration the question as to what shall be done when these piers shall be utilized to their limit of capacity.

The Council Committee on Harbors, Wharves and Bridges is now considering the questions of policy involved in the carrying out of this project. The main question is as to whether the city itself shall build and own the docks, or whether it shall allow a private corporation to construct and manage them.

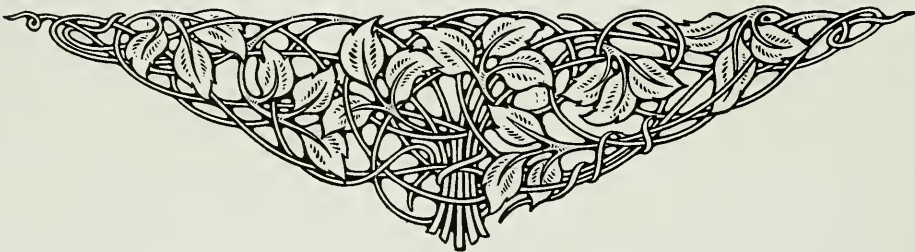
While removal of center pier bridges and the construction of docks north of the mouth of the river are the two problems of most pressing importance in connection with dock matters, they are by no means the only ones demanding attention. Harbors are classified as of two kinds, Commercial and Industrial. The harbor north of the mouth of the river would be a commercial harbor. For Chicago and the area tributary thereto, what is known as Industrial Harbor

Development is quite as important as Commercial Harbor Development. The branches of the Chicago River, the Sanitary District canal, the Calumet River and its branches and Lake Calumet all afford many excellent factory sites in locations having both water and rail transportation. In some cases the channels need widening and dredging. In particular, there is a project on foot for deepening and improving Lake Calumet, filling in large portions thereof, and thus providing a system of docks within a landlocked harbor that shall afford exceptional opportunities for industrial development.

The new steel plant at Gary, Indiana, means that cheap iron and steel will be available in the Chicago district for manufacturing concerns that use those products as raw materials. This should signify much for the future of Chicago as a manufacturing center.

The Harbor Commission in its report took the position that the entire area from Waukegan on the north to Gary on the south should be regarded as a single industrial community, with Chicago as its natural center. No development can take place in any part of this area without benefiting the whole. The Harbor Commission, therefore, very properly recommended that Chicago should take the leadership of the movement for improving the water transportation facilities, both commercial and industrial, of this entire area.

If the recommendations of the Harbor Commission be carried out, and if the water terminal facilities of the community be speedily improved, it is unquestionable that the public will gain much thereby.



Foundations

By EDWARD C. SHANKLAND

THE development of the foundations supporting the buildings in Chicago has kept pace with the evolution of the skyscraper, which originated in Chicago, but which on account of the restrictions imposed by the City has not been carried to the heights reached elsewhere.

The illustration on following page is a record of borings and caissons from 12th Street on the South, to Chicago Avenue on the North, and gives a comprehensive and accurate representation of the soil supporting Chicago's high buildings.

The following is a brief description of the location of the different borings.

Boring No. 1—Brand building now being erected at 1223-27 Wabash Avenue.

Boring No. 2—Addition to Fisher building, Dearborn and Van Buren Streets.

Boring No. 3—Chicago & Northwestern Railway Company's Office building, Franklin Street and Jackson Boulevard.

Boring No. 4—Northern Trust Bank building, La Salle and Monroe Streets.

Boring No. 5—Chicago & Northwestern Terminal Station now being erected at Lake and Clinton Streets.

Boring No. 6—Steele Wedeles building, Dearborn Avenue and Chicago River.

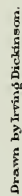
Boring No. 7—Montgomery Ward & Co., Chicago Avenue and Chicago River.

Boring No. 8—is submitted as a matter of interest. It is a record of an artesian well at Franklin Street and Jackson Boulevard for the Chicago and Northwestern Office Building and shows the stratification of the rock down to a depth of 1400 feet.

The soil underlying the business district of Chicago does not vary greatly down to a depth of about 75 feet below street level. Below this level and especially from about 100 feet below street level down to bed rock, great variations are found sometimes within a radius of only a few feet.

East and south of the Chicago river, and as far south as 12th street, the upper stratum was originally a yellow, sandy loam extending 12 to 15 feet below the street level. The material is very fine, more or less inclined to run and is subject to considerable shrinkage when the water is removed, so that it is not at all a satisfactory material upon which to build. Below this sandy loam is usually found a tough, blue clay, containing considerable quantities of yellow, sandy loam often giving the appearance of yellow clay. This stratum usually contains but little water and is hard digging with a shovel. It is hardest on top and gradually merges into a soft blue clay at 4 to 8 feet below the hard clay. This soft blue clay contains considerable fine gravel mixed through it, with numerous sand or gravel pockets from a few inches to several feet in diameter, and occasional granite or other hard boulders. This stratum usually extends to a depth of 50 to 60 feet below street level, where it gradually merges into a tough blue clay, of the same general nature as the soft clay above. This clay becomes harder and harder as the depth into it increases and becomes a hard, dry, blue clay that cannot be dug into with a shovel but must be grubbed. This hard clay stratum is found throughout the down town district of the city but varies greatly in thickness, 5 feet in some localities, 15 or 20 feet in others. In places it merges into the hard pan stratum, in other places it may change into alternating layers of hard, dry, blue clay and thin seams of compact loam or silt. In places it is found to overlay seams of tough, blue clay, from a few inches to several feet in thickness.

After passing through the upper 6 or 8 feet of hard, dry, blue clay the stratification becomes very irregular and the material found at one point cannot be taken as an indication of what may be expected a few hundred feet distant. Below the hard, dry, blue clay is often found 5 to 10 feet of hard, dry, flaky clay, which usually lays in thin seams 2 to 8 inches thick and separated by thin layers of silt. In other localities thick beds of compact, dry loam or silt occurs under the hard, dry, blue clay—this mate-



rial is often so compact that it must be loosened up with a grub, though, if dry it falls to pieces immediately upon being loosened up.

The hard pan stratum consists of fine and coarse gravel, stones and occasional boulders cemented with a hard, dry, blue clay, and varies greatly in hardness—often it is no harder than the hard, dry clay found above—in other places it is so hard that but slow progress can be made in it with railroad picks. This hard pan in places extends to rock; in other places it may overlay beds of fine sand, loam or gravel and boulders, with a second layer of hard pan on the rock.

Wherever rock lies below 110 feet below street grade with sand, gravel or loam immediately above, water usually occurs, rising in places 15 feet or more above the rock.

The distribution of boulders above rock is also very irregular; caissons have been put down to rock without striking a gravel bed or boulder, while less than 40 feet from the same caisson another put down where 12 feet of boulders were encountered, rock in both cases being at practically the same elevation.

The compressible nature of the soil makes the proper designing of the foundations a complex and somewhat difficult problem. The plain truth, pointed out by Mr. Frederick Baumann, who is known as the father of the isolated pier foundation, and which is described by him in a little book published in 1873, that a flat body resting on a yielding soil must be centrally loaded in order to settle evenly was not observed in the early days. As a consequence the settlement of those buildings was very uneven and their walls were apt to be considerably out of plumb. Before Mr. Baumann brought out his method of isolated foundations some improvements had been attempted from time to time, but not always with success.

One new architect introduced inverted arches in the foundations with the result that the posts were thrown out of plumb so badly, that extra anchors had to be provided to prevent the buildings from toppling over.

The most notable example of this was in the case of three water reservoirs built by the City of Chicago in 1854. Each one was 60 feet in diameter and 30 feet high, resting partly on the foundations under the

outside walls and partly on inverted arches sprung between them. The exterior was pressed brick with a good deal of cut stone. When finished and one was being filled with water the arch shoved out the foundations of the walls, and there would have been a total collapse had not the water been immediately drawn off.

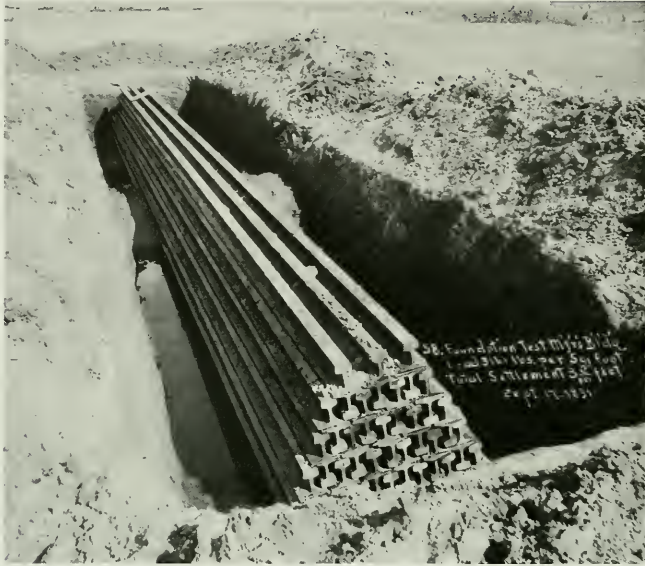
The old buildings, from three to six stories in height to be found on Adams, Monroe and other streets are typical of the class of buildings first put up after the fire. In these buildings the foundations vary in size according to the number of stories in the building. As a consequence the load per square foot on the soil under these buildings is often very great and averages much greater than those under buildings erected later. There are buildings of this type where the pressure on the soil from the dead weight of the building is from 14,000 to 15,000 pounds per square foot.

These excessive loads caused very great and very uneven settlement, but the buildings, being of brick and wood could withstand the distortion produced by the great variations in settlement, variations which would not be allowed in the more recent steel frame buildings.

Then too the settlement was not noticed because the street grades varied so much. Only a few years ago it was common to have steps in the sidewalk caused by the different grades of adjoining buildings and several such sets of steps would be found in the same block. Where the street varied in height several feet in the same block, the settlements of buildings however great, would attract little attention.

Some of these foundations rested on the blue clay spoken of above as being about 14 feet below street grade, but very often they rest on the filled ground, one foot or even two or three feet above the clay. This makes these buildings unstable when adjoining buildings are removed, and they have to be handled carefully when new buildings are erected as the foundations of the latter are carried down to a much greater depth. However, these buildings in the down town district are being replaced so rapidly that they are really not an important factor in the subway problem.

The next type is the spread foundation made of steel rails or I beams embedded in concrete. The



TEST MADE AT SOUTH END OF MANUFACTURERS AND LIBERAL ARTS BUILDING.



CAISSON, AMERICAN TRUST AND SAVINGS BANK BUILDING.

Rand McNally on Adams Street, the Royal Insurance on Jackson Boulevard, the Rookery, the Illinois Trust and Savings Bank, the Temple, and Home Insurance on La Salle Street, and the Marquette, on Dearborn Street are of this class. Buildings resting on spread footings are among the highest and costliest in the city and include besides those mentioned, the Marshall Field wholesale, the Masonic Temple, Tacoma, Monadnock Block, Great Northern buildings, Ashland Block and others.

In this type the load carried by each column or pier was accurately calculated and the area of its foundation determined by dividing this load by the assumed pressure per square foot. This pressure was commonly taken 3,000 pounds although in some cases it was taken as high as 4,000. Thus the areas and therefore the depths of the footings varied according to the loads. In the most successful buildings, the dead weight of the structures was alone considered in proportioning the area of the footing, for when the live load was taken into account the variations in settlement were greater. In erection the foundations were set up higher than they were ultimately intended to be in order to allow for the settlement sure to take place and which is all the way from 9 inches to over 20 inches. This necessitates also raising the inside line of the sidewalks and accounts for the steep slope of some sidewalks now to be found, where the assumed settlement did not take place.

When the construction plans of the World's Columbian Exposition buildings were begun in March, 1891, the bearing value of the soil at Jackson Park was an unknown quantity.

Over 200 borings were made on the sites of the main buildings, and the soil was found to average 1 foot black soil, 13 feet sand, the lower portion being saturated with water, 13 feet soft clay, hard pan being found at an average depth of 27 feet.

Loading tests were also made to determine the safe load to put upon the soil, also whether it would squeeze out under pressure, as most of the large buildings were to be placed on the banks of the lagoons.

The accompanying photograph of the test at the south end of Manufacturers and Liberal Arts Building is interesting. The load was 3161 pounds per

square foot on a base 3 feet by 3 feet one inch which caused a settlement of 8 inches while load was being put in place and in 90 hours the settlement was 3 feet 2 inches. The test was then discontinued; although the settlement had not ceased.

Pile foundations have always been used along the river and to some extent in the business center. The Medinah Temple, on Jackson Boulevard, The Federal building, on the block bounded by Jackson, Clark, Adams and Dearborn, and the Merchants Loan and Trust building, Clark and Adams Streets, are built on piles. In the latter building concrete walls were used on the west wall where the building adjoins the Chicago Edison building.

The latest type of foundations and the one used almost exclusively now for the high steel buildings is the concrete well or caisson. The word well is a better definition as it describes the method more accurately, but "caisson" has come into universal use and it will be used hereafter in this report. These caissons are preferably carried down to and rest upon bed rock which is found as stated previously at from 105 to 120 feet below street level. Sometimes, however, they stop at hard pan about 70 feet below street level and are belled out, that is the diameter of the caisson is increased at the bottom in order to reduce the pressure per square foot on the clay. The Corn Exchange shown on caissons going down to the rock. The west wall of Merchants Loan and Trust Company and the Chicago National Bank, and the Rector building, are supported on caissons which rest on the hard pan and are belled out.

The accompanying photograph shows bed rock in the bottom of one of the caissons supporting the American Trust and Savings Bank building, corner of Monroe and Clark Streets, at a depth of 105 feet below street level.

The use of compressed air in sinking caissons has been used for the first time on a large scale in putting down the caissons for the Chicago and Northwestern Railway Company's Terminal Station at Madison and Canal Streets. These caissons were completed a few months ago. They were dug down about 80 feet in the ordinary manner and then air locks were put in the shafts and the rest of the work down to rock about 120 feet was done under a pressure of 15 pounds.

Development of Fire Resisting Material for Buildings

By WILLIAM HOLABIRD

EACH passing year contains accounts of many fires, large and small, involving complete or partial destruction of valuable property and losses due to necessary rebuilding or extensive repairs, including the consequent loss in time and money before the business is again in running order. Such disasters as the Baltimore fire and the San Francisco conflagration have shown the unreliability of many classes of construction previously considered fireproof. Engineers, architects and builders throughout the country have been spurred to renewed efforts toward the finding of a material which will, in the highest degree possible, assure protection against the destructive effects of fire.

An article in "Insurance Engineering" several years ago by J. S. Sewell, then Captain of Engineers, U. S. A., gives the following conditions under which a material may be considered as fireproof, viz:

"It shall be incombustible.

It shall undergo no molecular change in a fire that will impair its strength or change its form.

It shall be possessed of considerable strength and shall be so applied that the expansion and contraction stresses due to rapid heating and sudden cooling will not destroy it or impair its usefulness.

It shall be a poor conductor of heat."

Other authorities have added further requirements, namely:

That the material shall be of such a nature as to make it adaptable not only as a protective covering, but also as a structural part of a building.

That it shall be economical in construction and require only a minimum amount of repair in case of damage by fire.

That it shall possess a rate of expansion nearly equal to that of the steel which it is designed to protect, so that at no time will the

metal be exposed to the heat of the fire through a cracking or falling away of the protective coating, or be liable to rust through contact with moisture.

Upon examination of the different fireproofing materials now available, it seems that the above conditions are most nearly fulfilled by two, brick and concrete. The former, when made of good quality, hard burned clay, either in the form of common or pressed brick, is indeed an excellent fireproofing material; but its extensive use as a protective covering for steel and its employment in any structural parts of the building is largely prohibited by the necessary massiveness of the construction and the resulting heavy cost of erection.

Concrete, however, meets the requirements more fully; hence it is used more and more in the construction of fireproof buildings. In the form of cement blocks it is being extensively used in the building of smaller business structures and private dwellings. Reinforced concrete is adaptable not only for the construction of the floors and partitions of steel skeleton buildings and for the protection of interior columns, beams and girders, but also, and most successfully, for the entire structural work of offices, warehouses, mills, factories, public buildings, etc.

Reinforced concrete, besides best fulfilling the conditions for a fireproof structure, has several other distinct advantages. Chief among these may be mentioned, continual improvement with age instead of deterioration, absence of vibration (an important factor in the construction of mills and factories), easy production of any desired architectural effects, and decrease in insurance and maintenance charges. It also permits a type of construction with a flat ceiling, thus decreasing the height of the outside walls, while preserving the same interior head room, lessening the cost of the building, making easier the installation and operation of sprinkler systems, and giving assurance that a stream of water from a fire hose against the ceiling will spread over the maximum area and

will not be deflected by intervening beams and girders.

Concrete, when tested in the laboratory in the form of cubes and exposed to high temperatures, showed a tendency to decrease in strength, and was therefore thought by many to be a poor fireproof material; but fire tests of floors and partitions and of buildings actually constructed showed no such discouraging results, as the concrete appeared to be little affected by the fire. Prof. Ira A. Woolson of Columbia University discovered the solution of this apparent contradiction in the fact that concrete was a remarkably poor conductor of heat, and hence the heat penetrated the thinner cubes more rapidly than the thicker concrete used in the floors tested and in the structural parts of the buildings actually erected. This is an item of the greatest importance in the selection of a fireproof material.

Several authorities state that when concrete is heated to a high temperature—say between 700° and 1,000° Fahrenheit—the moisture present in the form of water of crystallization is evaporated, and upon further application of heat is driven off. This process requires a considerable length of time during which the concrete is affected to the depth of only a quarter of an inch. To disintegrate the material underneath the heat must first pass through the dried-out upper portion, which is now a better non-conductor than before. This involves a period of time considerably longer than that of the severest fire to which any structure might be subjected, without considering the presence of apparatus for quenching the flames.

Because of this peculiarity of concrete it is found that a covering of two or three inches will amply protect from fire structural steel work; and the density of concrete preserves it from moisture and the formation of rust, while necessary repairs after the fire generally involve a mere resurfacing because of the spalling or chipping of the concrete at exposed corners, or the breaking away of the finish from the body of the concrete floor.

Since with all materials angular surfaces are more liable to damage by fire than flat or rounded surfaces, and with concrete a sharp corner is more liable to damage by water, it has been suggested as a remedy that all exposed corners should be rounded. With

a material like concrete this is very easily accomplished.

In many cases of floor construction time elapses between the placing of the concrete proper and the wearing surface or finish; thus the bond between the two is often imperfect. A better bond can be obtained by applying the finish coat immediately after the structural concrete of the floor is laid. This would probably prevent the scaling of the surface under fire.

In reinforced concrete construction some authorities think it best to place an additional coating around columns and girders in order that the danger of fire exposing the reinforcing steel and causing a weakening or possible collapse of the structure may be reduced to a minimum.

For fireproofing, and for partitions or other parts where no heavy loads are to be sustained, numerous tests and actual experiences have shown that the best material is concrete made with cement, sand and cinders; but in order to give the most efficient results the cinders should be of the best quality and contain a minimum amount of unburned coal, and the concrete must be well proportioned and mixed, and must form a dense compact mass. For floors and other structural parts of the building the most efficient fireproof material is concrete, made of gravel, trap rock, granite or limestone. Though fire may cause a calcination of the limestone concrete this rarely extends more than three-quarters of an inch below the surface, even after the severest fire.

Concrete has not lacked convincing proofs of its practicability and fireproofing qualities as the reports of experts and commissions, and the results of tests and actual experience have shown. Recent tests made by the U. S. Geological Survey at the Underwriters' Laboratories in Chicago were more severe than any possible conflagration and demonstrate clearly the efficiency of concrete as a fireproof material.

No one has forgotten the fires at Baltimore and San Francisco and the lessons taught. At the time of the Baltimore fire concrete was not so well known as it is today. In the area devastated there were only two buildings of four stories in which the floor systems were constructed throughout of reinforced concrete. In other cases where concrete was employed

it was used for floor panels in place of hollow tile, and as a covering for columns and girders. Yet, even at this stage in the history of concrete, the results of the severe tests of fire upon these earlier types of construction greatly encouraged those who believed in its fireproofing qualities. Experts and scientists in their reports spoke favorably of its value as a protective material.

In one instance the banking floor of a building was saved from injury by a floor immediately above it, which was of concrete construction; yet this floor was subjected to the falling debris of the floors and roof above which were of inflammable material and were completely destroyed.

Another interesting incident was the case of a four story brick building, with attic and basement, in which the original wooden floor system had been replaced by reinforced concrete, the floor panels being cantilevered to recesses cut in the brick walls. After the fire it was found that, as there was no real connection between the side walls and floors, portions of the side walls fell away leaving the upper floors exposed, while the front and rear walls of the building bulged outward. An examination of the floor system revealed the fact that although the concrete had spalled or chipped away from the edges of the beams and columns, and on wide flat surfaces had calcined in some places to a depth of $\frac{3}{4}$ inches, still the construction was otherwise apparently sound; furthermore, a test load of 300 pounds per square foot on a panel of the second floor gave a deflection under $\frac{1}{8}$ inch, though the total load for which the floor was designed was only 150 pounds per square foot. A

cantilevered section of the floor, subjected to a test load of 150 pounds per square foot, showed no serious deflection.

Again, in the San Francisco disaster, though there was not a single instance of modern reinforced concrete construction in the section of the city traversed by the fire, concrete was used extensively in floor construction and in covering steel columns and girders. Here also it demonstrated its fire-resisting qualities and its ability to effectively protect the metal and prevent buckling or collapse. A proof of the confidence which the people of San Francisco place in concrete is found in the fact that it has been extensively employed in the rebuilding of the city.

Fires such as those at the Dayton Motor Car Works and at the Huyler Building in New York City also reveal the ability of reinforced concrete, when properly constructed, to confine a severe fire to one floor or section of a building with little or no damage to floors above and below, and to allow the portions affected by the fire to be reoccupied in a few days' time.

It is therefore evident from the characteristics of concrete, as proven by tests and actual experience, that it is a most efficient fireproof material. To give the best results, however, it must be of good workmanship, well proportioned and mixed, and, where reinforcement is used, the steel must be so placed as to guarantee a sufficient amount of concrete protecting the metal. Observing these precautions there would seem to be no reason why concrete should not be universally used for this purpose. In the years to come it is bound to grow in favor in the minds of engineers, architects, builders and the general public.



Fireproofing Chicago's Buildings

By J. J. ROCKWELL

CHICAGO has been one of the leading cities of the country in developing the art of fireproofing buildings from the time of the construction of the Home Insurance Building, which it is generally believed was the first steel skeleton fireproof building ever erected, down to the present day when this type of building has become comparatively common.

What is known as the Standard Type of Fireproof Construction is that in which a building is constructed of a steel frame and the steel is then protected with a covering of Terra Cotta Hollow Tile Blocks, which also form the fireproof floors carried between the steel floor beams.

These blocks are, essentially, merely a modern development of brick, one of the oldest construction materials known. They are of clay, which in a plastic condition is molded into the various shapes and sizes necessary for purposes of fireproof construction, and the resulting blocks are then burned in kilns, as bricks are burned, under a temperature of two thousand degrees and upward.

Few persons, even in the building industry, recognize the tremendously important part which hollow tile blocks have played in modern fireproof construction. Indeed, it is doubtful whether the steel frame construction of buildings could ever have reached its present tremendous popularity, without the use of Terra Cotta Hollow Tile as a protection against fire, and as a means of constructing fireproof floor spans of sufficiently light weight to permit of the floors being carried to any desired height on a steel frame composed of members so light and of dimensions so small as to make the entire investment commercially economical.

The first function of fire proofing in a steel frame building is to protect the steel from fire. As an incidental fact, in performing this duty, it also protects the steel from corrosion and rust.

In connection with this duty it spans the spaces between the steel floor beams, thus forming fire proof floor arches which carry the loads placed on the

floors of the building in use, and at the same time effectually prevent the spread of fire from one floor to another.

In roof construction, Terra Cotta Hollow Tile answers the same purposes as in floor construction, but as roof loads are naturally much lighter, usually, than floor loads, the steel construction, and consequently the fire proof construction, are much lighter than in floor arches, and the methods of application are frequently different.

The next extremely important use of Terra Cotta Hollow Tile is for the construction of fire proof partitions for subdividing floor area as may be desired in the occupancy of the building, or as may be required for the division of large floor areas to prevent the spread of fire on a single floor. Under the classification of partitions are, of course, included closet and vault walls, enclosures for elevator shafts, et cetera.

The exterior walls of steel frame buildings are usually of brick or stone, through which moisture easily penetrates. To prevent this moisture from reaching and destroying the plaster on the interior Terra Cotta Hollow Tile Furring Blocks are used. These blocks provide a dead air space through which the dampness cannot go, and the plastering is applied direct to the inner side of these blocks without necessity for any additional furring.

It will be seen from the above that Hollow Tile Blocks act not only as a protective covering for the structural steel of a building, but they, at the same time, perform important structural functions. The few years just past have seen, of course, a great many developments of Fireproofing with Hollow Tile Blocks, chiefly along the line of recognition of the great structural value which this material has in addition to its fireproofing qualities.

Its structural value is seen most frequently in the development of what are known as Long Span Floor Construction Systems in which the Hollow Tile, with certain methods of reinforcing, is utilized to its greatest capacity as a means of economizing the amount of steel necessary in the construction.

It still remains true, however, that Hollow Tile finds its greatest use in the fireproofing of Standard Type Buildings, as spoken of above, and which represent the typical monumental buildings of Chicago, such as the La Salle Hotel, The Cook County Court House, The City Hall now in process of erection,

The Commercial National Bank Building, The First National Bank Building, the great new Blackstone Hotel, The Rookery Building, and practically all of the great monumental buildings of the city which give to the commercial center of the city its present architectural character.

Reinforced Concrete

By RICHARD E. SCHMIDT

THE latter half of the last century were years of triumph for steel and iron, but the universal reign of these is past and we are building largely with an artificial stone, i. e. cement, sand, stone and steel.

The use of mass concrete dates from very early times and has been used for centuries for foundations, fortifications and other structures where great strength was required. There are several examples of comparatively old mass concrete in Chicago, which have successfully withstood the ravages of smoke and the elements, namely, the old Staats Zeitung Building on Washington Street, the Farwell Block on Monroe Street, Lyon & Healy's building, and the Farwell home in Lake Forest, concrete reinforced with steel in the sense of its present day use, probably dates back only half a century.

Twenty-five years ago, probably nothing was taught of this form of construction in many of the Technical Institutions of the country, and the subject was not included in the curriculum of the Institute of Technology at Boston.

Monier, and the water tanks, drain pipes and jardinières which he built of beton and wire netting in France, were mentioned in the Architectural magazines from time to time, but such work was not recognized as a system of construction, and appeared to be more a kind of jugglery of materials.

Only a few more years passed and Mr. Ransome addressed one of the monthly dinners of the Illinois Chapter of A. I. A. and described his work in California. His description awakened some of the local architects to the comparatively unknown construction. Some were ready to grasp its importance

and at once apply themselves to the study, the investigation and the application of the new medium.

They were considered with pity and looked upon as cranks and harmless experimenters. The others were very skeptical and did not consider the new style of work as useful.

In June, 1900, the "American Architect and Building News" contained one of its earliest references to Reinforced Concrete, and printed an article, as a special fresh news item with the title, "The Proposed Building of a Seven-Story Building to be built of Concrete, in Connection with which large Twisted Iron Rods are to be used." The same volume of the "American Architect" contains a long article expounding on the great strengths, resistance to fire and comparative cheapness of solid concrete floors used in connection with steel beams spaced comparatively close together, and used in a number of contemporaneous English buildings.

When considering the present position of reinforced concrete in the art of building, it is almost impossible to conceive that a paper on such a primitive and costly method of using concrete and steel was read to a Society of Architects less than ten years ago, but notwithstanding its obscurity, a good number of buildings of reinforced concrete construction were built around the year 1900.

Inasmuch as new inventions and new methods usually appeal to the inexperienced and are practiced by them before the experienced man is willing to make expensive experiments on permanent structures, and as laymen do not recognize the difficulties and dangers as quickly as trained men, they are very often ready to adopt something new and make good

use of it before the trained men make their investigations and are willing to accept it. Consequently reinforced concrete work was practiced by the inexperienced and especially by men conversant only with sidewalk concrete work, who were without engineering knowledge and without any conception of the principles of reinforced concrete. The result was that a number of buildings collapsed, through the ignorance or haste of these people. The failures were probably not due to scamping, but to a lack of knowledge on the part of the principals and also from the lack of instructive knowledge of the construction on the part of the mechanics and laborers.

The actual accidents, also untruthful reports of the impending collapse of reinforced concrete buildings were noised about, and a wave of deprecation and opposition temporarily checked the advance of the new form of construction, which was to be expected, for such opposition to new inventions is the usual course. It was so when the first mills equipped with Arkwright's weaving machine were fired by incendiaries; when the coach owners went to Parliament to prevent the issuing of a charter for a railroad, and when the mobs drove off the surveyors of the first English railroad, but all of the attempted hindrances have had little effect. Most of the opponents finally saw "a light" and saved themselves by embracing one of the "systems." Only now and then is a lonesome bark heard, and today, if you ask architects, contractors, engineers and men of affairs for their opinion as to the most significant developments of the day in construction work, they will tell you, almost to a man, that it is the tendency to make concrete the universal building material. The possible exception will be a man who has been trained in the older forms of construction and is too old to learn. Few people realize the great number of uses to which concrete may be put and to which it is put in Chicago and throughout the world. It is used in the construction of the great bridges, viaducts, tunnels and subways. The forces of rivers and seas are defied by it. The largest engines, turbines, boilers and chimneys of immense power stations and skyscrapers stand on foundations of concrete. Boats, pontoons, telephone poles, railroad ties, electroliers, chimneys, vaults, prison cells, plumbing fixtures and even furniture are made of concrete.

When the antagonism to reinforced concrete from the few who are left and who were trained in the design and use of steel and masonry ceases altogether and everyone in the building world has more knowledge of reinforced concrete, the labor learns its use in the same instinctive manner in which it works wood and masonry, and organized research will have established high safe unit stresses in the same manner in which the Federal Government has fixed the allowable stresses in timber under different conditions in recent years, the use of reinforced concrete will be increased still more for reasons of economy.

Methods will be standardized and simplified, the cumbersome and expensive form work will disappear. Edison's scheme or some other will take their place, so that variety can be obtained, monotony and repetition avoided, and satisfactory interior and exterior finish obtained in one operation, doing away with furring, plastering and exterior trimmings.

Texture and modelling of the walls will be obtained at but little additional expense, so that bald buildings will be avoided; shade and form will be obtained by simple and expedient means.

The unfortunate color of Chicago common brick has been one of the city's misfortunes; in other cities the common brick is usually red so that the sides, rear and party walls appear as pleasing in color as the street elevation, whereas most of our buildings have only "fronts."

The salmon color of our common brick is soon dingy, weather beaten and finally blackened. Concrete, if it does become blackened and streaked, has an original color better able to bear it, so that its use will tend to better the general appearance of the city, and with the increased use of concrete, chemists will find new and pleasing cement colors, so that it will not always be gray.

The quality of cement will be improved so that the useful particles will be in the majority and the inert in the minority, permitting even lighter and more graceful construction. Methods will be found for retarding or accelerating the setting as will be desired.

Surface finish will be improved; new methods will be found to overcome the well known objections. It will be frankly treated as concrete and not as stone.

It will be used as a plastic material should be used, if the block form survives; the joints which are thereby an essential will become an essential element of good design, accentuated rather than hidden, recognized as they were in the Renaissance.

Inasmuch as concrete is built with shovel and trowel, and its proper ornamentation is cast in molds, it is evident that this method ought to depart from classic forms, that it means something new, and that precedent is only a stepping stone. Opening in the walls must be built and it is to be expected that they will vary from those used in an architecture of arches, vaults and lintels.

Chicago is leading the country in this method of construction as it did in steel construction, and the cause for the leadership is easily discovered.

In the first place our builders have always been pioneers, and inasmuch as unfinished reinforced concrete work is suitable for industrial plants and warehouses, Chicago capitalists were very quick to perceive the cheapness and advantage of this form of construction, consequently there are now innumerable very large buildings, bridges and viaducts, all of reinforced concrete, among them, a building which probably contains a greater floor area under one roof than any other building in the world, built of reinforced concrete from the foundations to the roof.

Inasmuch as a good hard rock suitable for reinforced concrete is so close to the surface of the ground in many places within the confines of the

city, in some instances, it may be crushed and used on the same property in which it was quarried, the cost of such construction is at a minimum, and further, nature has given Chicago such bountiful deposits of good building sand in the Lake, on its beaches, and in the enormous glacial deposits of the best of materials for fire resisting concrete, that is, gravel, all within the limits of cheap transportation, the raw material for Portland Cement being also at hand in large quantities in the confines of the city and the surrounding states, Chicago is indeed favorably located, in the economic center of activity of reinforced concrete construction.

The expansion in steel industries on the lower end of Lake Michigan, very close to Chicago, will produce the steel required by reinforced concrete at the lowest prices. Possessing the ingenuity of trained engineering skill, also all of the components of reinforced concrete, this material will lead all other forms of construction used in the city.

We will live to see it increase in use until wood is not used for structural purposes, if not actually prohibited. Its volume will increase in an ever increasing ratio and its uses in an increasing number of applications; some may be only ephemeral but the permanent uses will increase continually.

All other trades will remain and bloom; each will follow the line of least resistance and all humanity will benefit by better and more beautiful dwellings and structures of all kinds.



Chicago's Street Railways

THE earliest public transportation in the streets of Chicago was afforded by omnibuses. In 1853, Frank Parmelee & Co. and M. O. & S. B. Walker established bus lines in Chicago, and these remained the only means of public conveyance down to 1859.

In the year 1859 charters for street railroads were obtained for each of the three divisions of the city. February 14, 1859, the Legislature granted charters to the Chicago City Railway Company, and to the North Chicago Railway Company, and one week later a further charter was granted to the Chicago West Division Railway Company.

The Chicago City Railway Company at once began the construction of a street railroad under its charter, and, early in the Spring of 1859, the first horse cars ran on the streets of Chicago. The first line built was a single track road in State Street from Lake to 12th Street, and the equipment of the road consisted of 5 two-horse cars and 1 one-horse car. This line was soon extended to 22nd Street, thence to Cottage Grove Avenue and down Cottage Grove Avenue to 31st Street. The following year double track was laid from Adams Street to Cottage Grove Avenue. Lines were next extended by the Chicago City Railway Company on the West Side, along Madison and Randolph Streets to Ogden Avenue, and, in 1864, a branch was extended on Archer Avenue. By the close of the year 1867, the company operated 17¼ miles of track and its average daily receipts were about \$837.

The North Chicago Railway Company, like the City Railway Company, began the construction of lines immediately upon the granting of its charter. Within a short time tracks had been laid in North Clark Street from North Water Street to North Avenue, on Division Street to Clybourn Avenue, and thence to the then city limits, and in Wells Street to Division Street. Other lines were rapidly extended on the principal North Side streets. By 1867 the company owned 20 cars and operated about ten miles of road.

August 1, 1863, the Chicago West Division Railway Company, which had been incorporated more

than four years before, purchased the lines of the Chicago City Railway Company on Madison and Randolph Streets, paying \$200,000 therefor. In 1867 the West Division Company owned 20 miles of track and 65 cars; its average daily receipts were \$868.

These three principal traction companies, and their successors, reaching from the down town district to the North, South and West Sides, have always afforded by far the greater part of Chicago's surface transportation, and are the underlying companies with which Chicago's great traction problem has been mainly concerned. With the growth of the city a number of minor outlying companies have been formed reaching the outskirts of the city and its surrounding suburbs.

The early operation of street railways in Chicago was beset with many difficulties. The down town streets were paved with cobble stones and elsewhere with plank, which formed a very yielding and insecure road bed. The great fire of 1871 temporarily wiped out the greater part of Chicago's traction system. The West Division Company suffered least from its effects, but the track, rolling stock and barns of the North Chicago Company were entirely destroyed. However, the lines were quickly restored, and extensions were yearly added.

With the growing extensions of Chicago's street railways, the old horse cars became too slow. The cable had been successfully used in San Francisco, and January 17, 1881, the City Council granted the Chicago City Railway Company the right to construct and operate a cable system. The first cable cars ran on State Street to 39th, January 28, 1882.

The North Chicago Street Railroad Company was organized, May 18, 1886, by Charles T. Yerkes, then of Philadelphia, and acquired a controlling interest in the North Chicago Railway Company. The new company became the lessee of the old one and the operator of its lines. By agreement made by Yerkes with the city, utilization of the La Salle Street tunnel began in 1887. The cable system was adopted on all the principal lines of the North Side Company, June 7, 1888. Similarly, the West Chi-

ago Street Railroad Company, organized by Yerkes, acquired, in 1887, the control of all the lines of the Chicago West Division Railway Company, and became its lessee and operator. The next year the West Chicago Company began the installation of cables on its lines.

In 1893 the use of the overhead trolley was begun, and within the next few years, as fast as it was practicable to make the changes, this system was extended to all of Chicago's traction service.

In 1899 another great change in the management of the city's traction system took place. The companies on the North and West Sides were joined and the operation of all their lines was undertaken by the Union Traction Company.

The campaign for the betterment of Chicago's traction system was now fairly on, and raged fiercely until the final passage of the present Traction Ordinance by the City Council in February, 1907, and its ratification by the people in the April elections of that year. The Ordinance was promptly accepted by the Chicago City Railway Company, and in January, 1908, the Chicago Railways Company took over all the lines of the Union Traction Company, together with a number of subordinate lines and began the work of rehabilitation under the Ordinance.

The transformation of Chicago's wornout dilapidated street car service into an up-to-date superbly equipped traction system, without a superior anywhere, within the short space of time that has elapsed since the passage of the Traction Ordinance, is a veritable marvel of constructive achievement and has exceeded in realization the most sanguine hopes of the supporters of that measure.

Under the terms of the Traction Ordinance the Chicago Railways Company, operating the lines on the North and West Sides, and the Chicago City Railway Company, operating the South Side lines, have already expended on the work of rehabilitation over \$43,000,000. The work has all been done and the contracts let under the supervision of the Board of Supervising Engineers created by the Ordinance, and full value obtained for every dollar expended. In this labor an average of 6000 men have been daily employed; over 300 miles of new steel, grooved 129-pound rails have been laid in the most perfect road

bed that could be devised. The right of way of the companies along the lines has been repaved with new granite blocks, many hundreds of miles of conduit laid, and trolley renewed and erected. More than 300 miles of trolley poles have been set back from the street curb, and twenty-two new buildings and car barns have been constructed. The Chicago Railways Company has let contracts for the construction of the La Salle and Washington Street tunnels, on which work is now progressing. The Chicago Railways Company has 850 pay-as-you-enter cars in operation on its lines, while on the North and West Sides the Chicago Railways Company will shortly have in service 1,000 of these new pay-as-you-enter cars, and, in addition is remodeling 300 double truck cars into cars of the latest type. The city of Chicago receives 55 per cent of the net profits derived from the operation of these lines, and the patronage is rapidly increasing with the improved service.

With the final establishment of the through routes mapped out in the Traction Ordinance, Chicago's system of surface transportation will be as perfect as could be devised under existing conditions. Physical conditions, such as low subways, lack of bridges, insufficient equipment of connecting roads, etc., have caused delay in the establishment of most of these routes, and considerable public disappointment has been occasioned thereby. It is the belief, however, of the supervising engineers and traction officials that all the prescribed through routes will be in operation within another year.

Great progress is also being made toward the improvement of the traction service of the connecting companies operating outside the territory reached by the City Railway Company and the Chicago Railways Company. The former company already has an agreement with the Calumet and South Chicago Railway Company under which that road is operated under the supervision of the City Railway Company. Similar arrangements will doubtless soon be made between the Chicago Railways Company and the Consolidated Traction Company, operating lines as far as Evanston on the north and Lyons on the west. With such arrangements carried into effect the residents of the outlying districts will enjoy the benefits of a traction service unsurpassed in the world.

Chicago Railways Company

Remarkable Record in Work of Rehabilitation

UPON the formal acceptance of the present Traction Ordinance, January 28, 1908, the Chicago Railways Company took over the lines then operated by the Union Traction Company on the North and West Sides, together with a number of subordinate lines, comprising a traction system extending from 26th Street and Fortieth Avenue on the south and west to Devon Avenue on the north, and serving a population of 1,600,000 people. This new company is strictly a Chicago company, its stockholders and directors are Chicagoans, and, with characteristic Chicago energy, the company set about the work of complete rehabilitation of its vast network of lines. The transformation of Chicago's old street car service, familiarly known as "the worst in the world," into a modern traction system, "the best in the world," within the space of two years, is one of the marvels of modern constructive enterprise.

The Chicago Railways Company has voluntarily far exceeded the requirements of the Traction Ordinance. The best cars and the best track that money will buy have been provided; 177 miles of modern steel grooved rails, weighing 129 pounds to the yard, imbedded in concrete, with electrically welded joints, and costing about \$50,000 to the mile, have been laid. Six hundred and fifty new pay-as-you-

enter cars have been placed in operation on twenty different lines of this company. Three hundred and fifty additional cars of the same type are under construction at Pullman, which will soon be ready for use, and, further, over three hundred double track cars are being remodelled and converted into cars of the most modern style. Ten miles of extensions have been built, and new stations constructed. On this colossal work an average of 3,000 men have been daily employed, and already over \$22,000,000 have been expended in the undertaking.

The work of betterment, however, has not ceased. During the past year contracts have been let by the Chicago Railways Company for the construction of the La Salle and Washington Street tunnels, and work on them is now progressing. Orders have been placed by the company for thousands of new forged steel wheels, which will greatly diminish the noise and jar of the cars. With the establishment of further through routes as soon as operating conditions will permit, and with the completion of the tunnels, Chicago will have in every part of the city served by the Chicago Railways Company as nearly perfect a system of surface transportation as is physically possible.



Chicago City Railway Company

Work of Rehabilitation of This Company Far Exceeds Requirements of Traction Ordinance

THE Chicago City Railway Company, which provides surface transportation for the South Side, was in a position to accept immediately the Traction Ordinance passed by the City Council in February, 1907, and the work of rehabilitation along all its lines was forthwith begun. By the terms of the Ordinance the company had three years within which to complete the work of rehabilitation; the Chicago City Railway Co., however, has not waited upon the letter of the agreement, but has pushed the work on its lines to practical completion far in advance of the time fixed in the Ordinance.

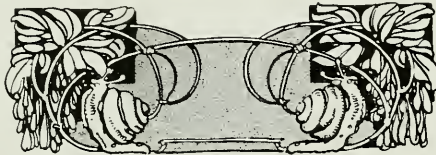
On this work thousands of men have been constantly employed, by day or by night, as conditions required. By November 1, 1909, the City Railway Co. had replaced old tracks with 109 miles of new 129-pound steel grooved rails, had provided the latest and best equipment throughout, and had transformed the old street car service into a modern traction system without a superior in the world. On this work of rehabilitation the City Railway Co. has expended over \$19,000,000.

Eight hundred and fifty modern pay-as-you-enter cars are now in operation over the lines of this company, riding over the heavy rails with the ease of a Pullman coach. Four new car barns with a capacity of 1051 modern cars have been completed. By the

terms of the Traction Ordinance, the street railway companies are to keep paved the sixteen feet of their right of way, and the Chicago City Railway Company alone, since the passage of the Ordinance, has laid 520,000 square yards of new granite paving. The company receives its power from the Commonwealth Edison Company, and maintains two storage batteries with sufficient power to operate all its cars for twenty minutes in case of breakdown.

On December 1, 1909, when the time granted the company by the Traction Ordinance for the work of rehabilitation had still over four months to run, the Chicago City Railway Company had completed 98 per cent of the work required by the terms of the Ordinance.

The company has earnestly endeavored to bring home to the people the fact that the city of Chicago is more than an equal partner in the net profits earned by the company, and to enlist the co-operation of the public in bringing its service to the highest possible degree of perfection. That the public appreciates the unexcelled service afforded by the Chicago City Railway Company is evidenced by the fact that its patronage has grown during the past year 15 per cent over that of the year before, and is still rapidly increasing.



Mechanical Cleaning

By G. B. F. OWEN

"HALF a Century of Chicago" could be no more "cribbed, cabined and confined" within the covers of a book than could the history of the world be compressed within the limits of a present-day telegram. Hence, in this necessarily brief and rapid retrospect it is only possible to touch the high spots and much has been omitted that is well worthy of notice if time and space would permit.

A moment's consideration will convince us that the fifty years now closing form an epoch probably unmatched in history as regards progress and development of every kind. Overlapping as it does two centuries, both remarkable for their discoveries, the best of both is at our command and it is peculiarly fitting that this great city, with her marvelous growth since the days of Fort Dearborn, should present a record of achievement that will be an inspiration for all generations and for all time.

Notable among the advances made, is the science and art of building. From the log cabin of the pioneer to the new Chicago City Hall is a far cry but every step has been the logical and legitimate outcome of study and experiment by specialists in their respective lines of endeavor, and who shall say that we have reached the ultimate? Yet, if human effort could no further go, we have numerous monuments to the skill and ability of those who have so bravely and generously blazed the way. And what a liberal education this has been to those privileged to see it. Was it not Pericles, the builder and beautifier of Athens, who said, "I found her mud and left her marble"? Even Moses, the greatest sanitarian of ancient times, has been passed by modern improvements. Opening a door or window is not now considered ventilation, nor is the making of a fire on the ground considered the proper way to heat a building. Drawing water from a well, or carrying it from the creek has been entirely superseded, and even modern water works are equipped with filtration plants. Daylight is "on tap" by a twist of the wrist. Cooking is done by gas, and the general trend of all improvements has been toward simplicity and the saving of time and labor.

One of the more important developments and one of the latest in this history-making epoch is Mechanical Cleaning. With the advent of larger, more beautiful, more complex and more expensive buildings came the problem of *keeping them clean*, not so much from an economic point as to meet the physical difficulties presented. As the best ideas are frequently of humble origin, so this great industry had a very modest beginning. It was a railroad car "hostler," or cleaner who, after spending many years in the effort to dislodge dust and dirt from car cushions and other furniture in the ordinary way, conceived the idea that it might be possible to use compressed air, which is a common adjunct to every railroad yard; to blow this dust and dirt from his cushions instead of beating and brushing them. Greatly to his surprise the work was much better done and in much less time. A patent was taken out in the early 80's, since which time over twelve hundred patents have been allowed, all pertaining to this great modern industry. For many years after the issue of this first patent intelligent effort was made to popularize the subject, but it was not until more recently that it became a commercially valuable proposition. A striking evidence of this is the fact that less than four years ago the architect who would consider Mechanical Cleaning was a rarity, the opinion seeming to obtain that even the most improved and scientifically perfected system now known the world over under the name of "Vacuum Cleaning," was a fad, or a toy, or an experiment, or something for the very wealthy, but not worthy of serious consideration. Today, however, the architect is still more rare who does not provide for Vacuum Cleaning in his plans and specifications for any building, from a residence to the State Capitol. Following the development of a crude idea through all the stages of experiment, elaboration and simplification into the position it now occupies among the world's utilities, and which is daily becoming a greater necessity, is a most interesting page of history. As soon as it was proven a success, capital and brains vied with each other to participate in the opening of a new field. As in all such cases an immense variety

of ideas was put forth and more or less elaborately and intelligently exploited, until the market became flooded with everything that could be suggested from the original system of high efficiency and rapid operation, adapted to every class of building and every character of interior surface and furnishing, down to the exaggerated hand syringe, which even in this day of enlightenment is offered to an unsuspecting public.

As no chain can be stronger than its weakest link, so no Vacuum Cleaning System can be better than its least efficient part. Such a System properly designed may be said to consist of five distinct elements, each of which must be scientifically adapted not only to its own function, but to every other part of the System. These elements may be considered as follows:

1. Vacuum Producer.
2. System of Dust Separation.
3. System of Automatic Control.
4. Vacuum Conduits.
5. Cleaning Tools.

In addition to the structural features above named there are several vitally important matters that must not be overlooked, for instance:—Automatic Control, without which no System today is tolerable. Until the perfection of this device the engine and pump were started by the engineer and ran continuously whether sweeping were being done or not, until he stopped them. Vacuum consumes power:—power costs money, and the only control available was such as is known as “engine regulation,” which governs its speed to a certain extent, but at no time shuts off the power completely. Automatic Control on the other hand enables the operator of the tool at any distance from the plant to absolutely and automatically open and close the steam supply in exact proportion to power needed for the actual work done. In a word, when actually sweeping, power is used and is automatically supplied, but during any intervals of inaction, whether momentary or of longer duration the steam is automatically shut off, while at the same time a predetermined maximum vacuum is available at the tool at all times, whether power be shut off or not. It also preserves a uniform degree of vacuum *per tool* regardless of the number of tools in use, shutting off power in a 6-sweeper plant 5-6 of the time if but one tool be in use, and automatic-

ally supplying power as more tools are added. This will average a saving in cost of operation of about 50 per cent as against the types lacking this important feature.

Dust separation in many cases is accomplished by drawing the dust-laden air through a body of water, or past a spray nozzle. Modern refinement in the art seems to show that this water separation is both unnecessary and undesirable; unnecessary, because dust can be separated and is being separated from the air without any water whatever; undesirable, because it takes about one-fourth more vacuum than is necessary to do perfect cleaning, to pull this dust-laden air through a body of water, and vacuum costs money.

Keeping in view the important fact that vacuum costs money because it requires power, it is easy to see that every inch of Vacuum Conduit from tool to tank should be smooth and unobstructed throughout. This means something better than ordinary pipe fittings, or even than drainage fittings, neither of which type was primarily intended for vacuum work, and for this reason special fittings had to be designed and made for this service.

Cleaning Tools of every conceivable shape and material have been offered. Many of them seem totally unfit in design and operation for the work expected of them. It is really a fine art to differentiate between the good and the bad in the matter of cleaning tools. Experience in this as in most others is the best, though sometimes most expensive, teacher.

Until recent years mechanical cleaning has never been accomplished without the use of more or less cumbersome and costly machinery. Either a vacuum pump or an air compressor, operated directly or by steam or indirectly by electricity, was a part of every such equipment. These complications, translations, transmissions and deviations in the use of power cause losses in all directions, aggregating 80 to 90 per cent. This in itself was very costly. The machinery and installation were necessarily expensive.

The wear and tear on machinery in the old-style Vacuum System is very great, especially in the valves and cylinders of the vacuum pump, where the entrained dirt-laden air soon cuts the sliding parts and utterly ruins it. It is safe to say that no old-

style vacuum cleaning plant in use in any part of the country has maintained its full efficiency for six months after installation. The modern System has neither engine nor pump, and maintains its highest efficiency indefinitely.

Outside the question of price of plant and maintenance comes the cost of operation. The real question should be "How much will it cost to operate a one-sweeper plant one hour?" Or, "How much coal will be needed to produce a sufficient vacuum to operate a one-sweeper plant one hour?" (A one-sweeper plant means a one-man operated plant, and "Sufficient vacuum" would mean a vacuum of sufficient intensity to operate the largest cleaning tool properly.) Answering this question would say that with steam at a hundred pounds pressure the maximum cost per sweeper hour should not exceed $5\frac{1}{2}$ cents. This, under very ordinary conditions of fuel cost and boiler performance, will enable a man, woman or boy to sweep and clean four times the surface ten times better and in a hundred fold more sanitary manner than is possible with brooms and carpet sweepers.

By a strange coincidence the year that gave us the first U. S. Patent on mechanical cleaning devices, also marked the period at which the scientific world first published the result of its work in tracing the origin of many infectious diseases, and today it is a scientifically demonstrated fact that dust is the most prolific source of disease and death among mankind. Sweeping with broom or brush and more particularly the process known as "dusting" gets rid of only such matter as is large and heavy enough to be classed as "dirt" while most of the finer and more dangerous "dust" is merely raised into the air, held for a time in suspension, and then settles back on walls, furniture, books and floor.

In-doors dust contains a far larger proportion of germs than does the air out-of-doors, for the reason that the large volumes of air out-of-doors, which are more or less constantly moving, so dilute the germ-laden air that the actual number of living organisms in a given volume is on the average very small, while in a recent test made in a school room in one of our principal cities, the dust that settled on 100 square feet of surface was collected and weighed, and the number of germs or living micro-organisms found

in this amount of dust, $22\frac{1}{100}$ of an ounce, was thirty-eight and one-quarter millions!

From the original desire to clean car seats evolved the ability to clean carpets, rugs and upholstery. Mechanical ingenuity, never willing to stand still, saw that its sphere must be extended to uncovered floors, walls, ceilings, draperies, and in fact the whole interior of a building, and practical tools were designed for each of these uses, so that the same system with an almost instantaneous change of cleaning tools can perform equally good work on any surface and in the most inaccessible places, and we find this great utility has earned its way all over the civilized world and into practically every class of building that is kept clean. Its source of power may be almost any form of kinetic energy, of which the usual commercial types are steam, electricity, gasoline, or even water.

In its development from the work in a railroad car to that of a large building new problems constantly presented themselves, and had to be met. This fact, perhaps more than any other, called forth persistent effort to adapt the appliance to new conditions, so that today we have buildings containing one million square feet of floor space to be cleaned, and there are tools with which to do it, tools that sweep in both directions and also at both ends, while sweeping a swath 36 inches wide and about 4 feet long at each motion, and 6,000 square feet of floor space an hour sanitarily and completely cleaned by one man is neither impossible, nor even unusual. The inevitable result was that architects, contractors, and owners became deeply interested in the subject. Inquiries from all parts of the country became so numerous and showed such a dearth of tabulated information as to what should be demanded in a vacuum cleaning system that a sort of standardization of specifications became necessary, that the busy architect might have in his reference library a concise form suggesting the points to be covered in drawing his plans. So we see that vacuum cleaning has assumed its place in the commercial world, not only as a 20th Century necessity, but has evolved into the dignity of an industry with its own specifications, and in this as in many other lines of endeavor the "I will" spirit of Chicago has produced results that are the admiration of the world.

The Use of Wall Finish

By GEORGE T. GOODROW

THE term Wall Finish includes all classes of water color preparations used for the whitening, tinting or decorating of walls and ceilings, the material in common use for such purpose being kalsomine, distemper colors and the various brands of prepared wall finishes found on the market.

Wall finish is employed more extensively in the treatment of interior wall surfaces than wall paper or any other class of material, for although in the average dwelling wall paper is still used to a large extent, almost all office buildings, hotels, churches, theaters, schools, and large public buildings are treated throughout with wall finish.

The necessity for frequent refinishing of walls and ceilings, due to the accumulation of smoke and dirt, or for the purpose of changing the color to suit different tastes and requirements, or last, but not least, for the maintaining of strictly sanitary conditions, is what renders the use of a water color wall finish more highly desirable for this work than any other material, for it can, if properly made, be entirely removed with sponge and water when desired, even though a number of coats have accumulated, the walls being thus kept in the most perfect and sanitary condition with the least possible cost.

It must be borne in mind that no matter what material is applied to walls, be it wall paper, wall finish or other covering, coat after coat can not be applied indefinitely without removing the old material. The time will come when it is desirable, if not necessary, to get down to the bare walls and take a fresh start, therefore a material that can be removed with the least labor and without damage to the wall surface is the most practical, satisfactory and economical.

From an artistic standpoint as regards interior wall decorating, the plain solid harmonious tints and colors obtained through the use of wall finish are most appropriate and desirable. The soft, dead-flat effect produced gives an air of repose and delicate richness with which no other treatment compares, and there is the great advantage of being able to tone up the shades to harmonize with any furnishings.

Many beautiful interiors are rendered commonplace and vulgar by the application of figured wall

paper to the rooms. Architectural lines are destroyed, and the walls brought into such prominence that the most elaborate furnishings are often rendered dull and inconspicuous. The effect is oppressive, tiresome to the eye and distracting to persons of refinement and good taste.

The average household contains a multitude of furnishings in the way of furniture, pictures, draperies, bric-a-brac, etc., for which the walls form a background, and this background should be a perfectly plain harmonious shade if it is desirable to have these furnishings show up to the best advantage. If any ornamentation is desired it should be brought in at the ceiling line, in the form of a stenciled or hand painted border or frieze, but a cove or room moulding suitably colored is generally sufficient.

That the above facts are becoming known to the householder, and the many advantages of wall finish over other decorative materials more generally appreciated by the public, is evidenced by the rapidly increasing use of this material, as indicated by the government statistics covering its manufacture. Architects, superintendents of public and private institutions, school boards and sanitary officials indorse its use and specify some reliable brand of wall finish for work in their charge.

The leading brands of wall finish in the market can be obtained in any shade required, and are far more reliable and satisfactory in service than the old style kalsomine made from whitening, common dry colors and glue, as the binding ingredients used are more permanent and are adjusted to just the right point so that chalking and peeling never occurs; also, the colors being made expressly for water color work and thoroughly milled together with the white base, are free from grit or sediment, resulting in superior working and covering properties, freedom from spotting or clouding, and give greater clearness of tone and permanency.

These advantages, however, apply only to the better class of wall finishes, that require boiling water for mixing, the finishes soluble in cold water having been found lacking in the most essential features.

Electric Protection in Modern Bank, Safe and Vault Construction

IN view of the large number of new bank and trust company buildings recently completed, or in course of construction, special interest attaches to the prevailing systems employed in safe and vault construction. The Baltimore conflagration, the San Francisco earthquake and other recent disasters have served to exhibit the durable and surviving qualities of modern safe and vault construction in contending against the elements. The most scientific methods and most patient labor has been bestowed by safe and vault constructors and experts upon the subject of resisting the clever tactics of the professional safe burglar.

The attention of bank and trust company officials, interested in modern safe construction, has been directed of late to the successful achievement credited to a Chicago company. The American Trust and Savings Bank of Chicago adopted this system of electric protection which has thus far withstood the severe tests of government officials and has proven itself to be invulnerable against attack. Before installing a system of safe and vault construction the American Trust and Savings Bank employed engineers to investigate the subject and finally adopted the electric protective system devised by James W. Donnell, president of the Donnell Safe Company.

Trust companies are among the foremost to encourage and accept improvements in safe and vault construction because of the large sums of money, negotiable instruments, bonds and securities and valuables held in trust. Moreover, the average bank or trust company official prefers to leave the bank knowing that his institution is equipped with the most advanced and proved system of safe construction.

The report of J. G. Carlisle, as secretary of the U. S. Treasury Department, which was published September 29, 1893, in book form, showing how easily safes were blown by explosives, made quite a stir among bankers, as well as safe men. It led to a new construction of burglar-proof vaults and safes by the making of heavy solid plates of armor metal and also casting safes made of manganese metal and

also constructing vaults of steel rails, laid up in concrete, and also steel and electric linings.

Most of the safe manufacturers having only the machinery for constructing old style laminated plates paid but very little attention to it, as the book was not generally distributed among bankers and the public. However, the parties making their safes out of solid castings and those using the laminated plates had them blown in a short time. Burglars also reaped a harvest by opening this class of laminated construction.

A few years ago the Government's attention was called to the easy manner by which both the laminated plate safes and solid casting safes could be opened in a few minutes by the electric arc or compound blow pipes. Holes were put through 6 inches of metal in less than one-half hour. This led to a further investigation by the Government and their engineer made the following report:

First: That the best types of safes or vaults are not invulnerable to the attacks of the expert burglar.

Second: That the ordinary or obsolete types of safes or vaults, constructed relatively a few years ago, are not invulnerable to the attacks of the tyro or amateur burglar.

Third: That if, by any combination of circumstances, sufficient opportunity be afforded the expert cracksmen, any safe or vault can be opened.

Fourth: That a satisfactory form of electric protection is both obtainable and desirable for all safes and vaults wherever applicable, and constitutes a form of protection superior to that afforded by the construction of the safes and vaults themselves.

In 1893 Jas. W. Donnell of Chicago, who is an old safe expert, became convinced that any safe made of either laminated plates of steel or solid casting steel could not stand the test of burglars for one-half the time they had to work. His experience with the electric arc and compound blow-pipe made it very evident that the security afforded by any of them was but for a few hours' time and some of them for a few minutes' time. This led to a new departure

in the construction of burglar work, which has proven successful and is endorsed by both electrical experts and engineers throughout the country.

This construction consists of steel rails fastened in solid steel corners so shaped as to take the form of the rail in snugly. Between the head of the rails there is a steel rod held in position by a steel key block in such a manner that it makes it impossible to pull the rails apart unless the heads of the rails are sheared off. This steel key bar and lugs extend all around the vault on top, bottom, sides, front and back. On the inside of this rail lining there is a steel lining composed of two plates of steel. Between these two plates there are placed electric envelopes, made of four layers of tin foil, each insulated and separate from the others. These electric envelopes are connected up in series throughout the vault and are thoroughly insulated. On the outside of the vault lining there is a housed alarm box electrically lined same as the vault. This alarm box contains two large 18-inch steel gongs, which notify the public of any tampering with the system for a great distance around. It is impossible to tamper with these bells without creating an alarm. This electric system is also connected by wires to the police station so that

if an alarm is given at the bank the police will be notified at the same time. This system is under full control of the officers of the bank and works automatically, governed by a chronometric time lock for the number of hours it is desired to be locked out. This system at all times can be tested, and the vault entrance can also be made to connect with the electric system. The doors cannot be opened without an alarm being sounded. These doors are also made of heavy construction, and the plates of the door are insulated so that they cannot be drilled with the electric arc.

These doors have double the security of any solid door, and are sold subject to a test of this character. The rails of the vault are placed two inches from the inside lining. The outer walls are made of concrete and quartz, thus imbedding the rails in a solid concrete wall in a manner that they are safe against explosives and the electric arc, or other appliances now known to burglars.

The security these rails afford is thoroughly recognized by the bankers of Chicago, as they have put in over eighteen of them within the past two years. They are not as expensive as the old laminated and solid plates are, but afford more security.



The Wonderful Durability of Wood Paving

THE bulletin issued by the Forest Service in the U. S. Department of Agriculture cites the following instances of the great durability of creosoted wood block pavements.

The first two were U. S. Wood Blocks laid by this Company and the blocks in the third instance were very similar to ours.

"In Baltimore, Md., in the summer of 1901, there were laid several adjacent strips of experimental pavements, including sheet asphalt, creosoted wood, and several kinds of brick. After five years' service, and after passing through the great fire, the wood was in better condition than any of the others.

"In 1902 the Metropolitan Street Railway Company, of New York City, decided to experiment with creosoted wooden blocks for paving between its tracks. A small area of longleaf pine was laid on Hudson Street, the wood being flanked at either end by granite, the material hitherto used. At the point selected there is a very heavy trucking traffic from

the North River wharves, and the stresses on the pavement, where the trucks run with one wheel just outside the car rail, are so great that the granite begins to show a rut in six months, and is renewed almost annually. At the end of four years the wood, though showing a heavy rut, was still sound and in position and good for at least one more year. The granite on either side had been renewed three times during the four years.

"In front of the Auditorium Hotel, on Michigan Avenue, Chicago, is a creosoted longleaf pine pavement, laid in the year 1900. Adjoining it an area of asphalt block was laid at the same time. In 1905 the asphalt blocks were removed and replaced with wood. In the five years the asphalt had worn down on an average one inch, but very unevenly, so that ruts had formed and the blocks were badly rounded. The wooden blocks during this time had worn off only one-eighth of an inch, and the surface, except for a badly constructed gutter at one point, was still perfectly smooth and of even grade."



The Metal Weather Strip

THERE is perhaps no problem so annoying to the householder as that of windows and doors with their manifold difficulties, and in order to overcome it the metal weather-strip has been a serious study for over twenty years and numerous complicated styles have been patented, but were generally pronounced unsatisfactory. Within the past five or six years more simple and practical metal strips have been patented and are extensively used and the results are decidedly successful. They are gradually superseding the storm sash which in a few years will be considered antiquated.

French and casement windows, so commonly installed in residences at the present time, have been a source of worry to Architects and Owners until the modern metal weather-strips have made them air-tight and water-proof.

Formerly the greatest drawback to metal strips was that it was necessary to install them before the building was completed or remove the sash in completed buildings to apply them, but now the windows and stops can be in place and the metal strips fitted without removing the sash; furthermore, some of the patents are made of a material that makes no allowance for contraction and expansion of the sash as the modern strip does. In addition to being weather-proof the latest strip is a dust shield as well as a window-slide.

Lack of space will not permit of the enumeration of all the articles that can be improved by the application of the metal strip. We will mention a few besides windows and doors: refrigerators, book-cases, show-cases, show windows, clothes closets, in fact any articles, or openings closed by a window or door, which are to be kept air-tight or dust-proof.

BUILDING ORDINANCES

of the

CITY OF CHICAGO



As contained in Chapter XV of the revised Municipal Code
of Chicago (passed March 20, 1905, published April
15, 1905), together with all amendments
up to and including July 18, 1910

CHAPTER FIFTEEN

ARTICLE I.

OFFICERS—POWERS AND DUTIES.

Section 199. *Department of Buildings Established—Officers.*—There is hereby established an executive department of the municipal government of the city, which shall be known as the Department of Buildings, and shall embrace a Commissioner of Buildings, a Deputy Commissioner of Buildings, an Assistant Deputy Commissioner of Buildings, a Civil Engineer, a Secretary to the Commissioner, a Chief Building Inspector, and such Inspectors of Elevators, Inspectors of Stand Pipes and Fire Escapes, and Inspectors of Buildings, and such other assistants and employees as the City Council may by ordinance provide.

Sec. 200. *Building Commissioner—Office Created—Appointment—Bond.*—There is hereby created the office of Commissioner of Buildings. He shall be the head of said Department of Buildings, and shall be an experienced architect, civil engineer, builder, or competent building mechanic, and shall have been engaged in the city as an architect, civil engineer, builder or building mechanic for a period of ten years, and during his term of office as Commissioner of Buildings, he shall not be engaged in any other business.

He shall be appointed by the Mayor, by and with the advice and consent of the City Council.

The Commissioner of Buildings, before entering upon the duties of his office, shall execute a bond to the City in the sum of twenty-five thousand dollars, with such sureties as the City Council shall approve, conditioned for the faithful performance of his duties as the Commissioner of Buildings.

As amended by ordinance Feb. 3, 1908.

Sec. 201. *Powers—Appointment of Subordinates—Bonds—Duties of Commissioner.*—He shall have the management and control of all matters and things pertaining to the Department of Buildings, and shall appoint, according to law, all subordinate officers and assistants in his department and may remove them according to law. All subordinate officers, assistants, clerks and employees in said Department shall be subject to such rules and regulations as shall be prescribed from time to time by said Commissioner.

It shall be the duty of said Commissioner to enforce all ordinances relating to the erection, construction, alteration, repair, removal or the safety of buildings.

Sec. 202. *Precautions in Behalf of Public Safety—May Require Repair or Alteration in Such Cases.*—Amended by ordinance Feb. 3, 1908, to read as follows:

It shall be the duty of the Commissioner of Buildings, when any citizen represents that ashes or combustible materials are kept in any place in the City in an insecure manner, or that the doors, stairways, corridors, exits, or fire escapes in any factory or workshop or other place of employment are insufficient for the escape of employees in case of fire, panic, or accident, or do not comply with the provisions of this chapter or that the funnels, flues, fire boxes, or heating apparatus in any building in the City are insecure or dangerous, or that any part of any building in the City is in an unsafe or dangerous condition, or in any wise in contravention of this chapter, to make an examination of such place or build-

ing, and if such representation is found to be true, said Commissioner shall give notice in writing to the owner, occupant, lessee or person in possession, charge or control of such place or building to make such changes, alterations or repairs as public safety or the ordinance of the City may require.

Upon failure of parties so notified to comply with said notice, the matter shall be placed in the Law Department for prosecution.

Sec. 203. *Access to all Buildings for the purpose of Investigating Complaints—Interpretation of this Chapter.*—Amended by ordinance Feb. 3, 1908, to read as follows:

The Commissioner of Buildings, or his representatives, shall have access to all public school buildings, public halls, churches, theaters, and all buildings used either for manufacturing or commercial purposes, also all hotels, apartment houses and other buildings occupied by large numbers of people, where any complaint is made concerning the safety of such buildings, or any parts or appliances or equipment thereof; for the purpose of investigating and determining the sufficiency of their doors, passageways, aisles, stairways, corridors, exits, or fire escapes, and generally their facilities for egress in case of fire or other accident, and the strength of their floors, and shall make return of all violations of several provisions of this chapter to the Law Department for prosecution.

The Commissioner of Buildings shall have full power to pass upon any question arising under the provision of this chapter subject to the conditions, modifications and limitations contained therein.

Sec. 204. *Inspection of Elevators—Powers to Stop Use of Same.*—The Commissioner of Buildings shall have power to prohibit and stop the use of any passenger or freight elevator when any Inspector of Elevators shall report to him that such elevator or the hoistway in which it is used is in a dangerous or unsafe condition. Such prohibition of use shall continue in force until such hoistway or elevator, or both, shall have been put in a safe condition, and certified to be safe after a proper inspection thereof by the Inspector of Elevators.

Sec. 205. *Buildings Found in Unsafe Condition—Notice to Owner—Authority of Commissioner.*—If the Commissioner of Buildings shall find in the city any building or structure or part thereof in such an unsafe condition as to endanger life, but so that, by the immediate application of precautionary measures such danger may be averted, he shall have authority, and it shall be his duty to forthwith notify in writing, the owner, agent, or person in possession, charge or control of such building or structure or part thereof to adopt and put into effect such precautionary measures as may be necessary or advisable in order to place such building or structure or part thereof in a safe condition. Such notice shall state briefly the nature of the work required to be done, and said Commissioner shall specify in such notice a time within which the work required to be done shall be completed by the person notified, such time to be fixed by said Commissioner upon taking into consideration the condition of such building or structure, or part thereof, and the danger to life or property which may result from its unsafe condition.

If the owner, agent or person in possession, charge or control of such building or structure, or part thereof, when so notified, shall fail, neglect or refuse to place such building or structure, or part thereof, in a safe condition, and to adopt such precautionary measures as shall have been specified by said Commissioner within the time specified in such notice, in such case, at the expiration of such time, it shall be the duty of said Commissioner to proceed forthwith to do, or cause to be done, any and all work necessary to place such building or structure, or part thereof, in a safe condition.

If the said Commissioner shall be unable to find the owner of such building, structure, or part thereof, or any agent or person in possession, charge or control thereof, upon whom such notice may be served, he shall place or cause to be placed the notice herein provided for, upon such building at or near its principal entrance, and if, at the expiration of the time specified in such notice for the completion of the work required to be done the terms of such notice shall not have been complied with, it shall be the duty of the Commissioner to thereupon proceed and do such work in the same manner as has hereinbefore been provided in cases of refusal, neglect or failure on the part of the owner, agent or person in possession, charge or control of any such building, structure or part thereof, when so notified.

If, in accordance with the provisions of this section, the work of placing any building, structure, or part thereof in a safe condition shall devolve upon the said commissioner, and it shall appear that such building, structure or part thereof is in such a condition as not to warrant the expenditure thereon of a sufficient sum of money to make such repairs or to do such work as is necessary to put it in a safe condition, the said Commissioner shall have authority to tear down or destroy such building or structure or part thereof, and the expense of tearing down and destroying any such building or structure or part thereof, and the expense of making any repairs or doing any work thereon shall be charged to the person owning or in possession, charge or control of such building or structure or part thereof, and the Commissioner shall recover or cause to be recovered from such owner or person in possession, charge or control the cost to the city of doing such work.

Sec. 206. *Building or Part of Building Constructed in Violation of Chapter.—Authority of Commissioner to Tear Down.*—If it shall be found that any building or structure or part thereof is being or shall have been constructed or built in violation of any of the provisions of this chapter, the Commissioner of Buildings shall forthwith notify the owner, agent, superintendent or architect of, or the contractor engaged in erecting such building or structure, or part thereof, of the fact that such building or structure, or part thereof, has been, or is being, constructed or erected contrary to the provisions of this chapter, and shall specify briefly in such notice in what manner the provisions of this chapter, or any of them, have been violated, and shall require the person so notified to forthwith make such building, structure, or part thereof, conform to and comply with the provisions of this chapter, specifying in such notice the time within which such work shall be done.

If, at the expiration of the time set forth in such notice, the person so notified shall have refused, neglected or failed to comply with the request made in such notice and to have such building or structure, or part thereof, concerning which notice was sent, changed so as to conform to and comply with the provisions of this chapter, the Commissioner of Buildings shall have the authority, and it shall be his duty, to proceed forthwith to tear down or cause to be torn down

such building or structure, or such part thereof as shall or may have been erected and constructed in violation of the provisions or any of the provisions of this chapter, and the cost of such work shall be charged to and recovered from the owner of such building or structure or from the person for whom such building or structure is being erected.

Sec. 207. *May Direct Fire Department to Remove.*—The Commissioner of Buildings shall also have authority to direct the Fire Department, after written notice has been served upon the owner, lessee, occupant, agent or person in possession, charge or control, personally, to tear down any defective or dangerous wall or any building or any part thereof which may be constructed in violation of the terms of this chapter. In case of the destruction, or partial destruction, of buildings by fire or by the action of the elements, when any department of the city government, pursuant to the ordinances of the city, shall make any outlay of money or incur any liability for the payment of any expense on behalf of the city in an effort to preserve or prevent the destruction of any such building or buildings, or for the preservation of the life or health of its citizens, it shall be the duty of the Commissioner of Buildings to ascertain the amount of such outlay or expenditure and present a bill therefor to the owner or owners of any such building or buildings, or his or their agent or agents, and it shall be the duty of the said Commissioner of Buildings to refuse to issue a permit for the reconstruction, alteration or repair of any such building or buildings by such owner or owners until such outlay or expenditure shall be repaid to the city by the owner or owners of such building or buildings so totally or partially destroyed in the manner aforesaid. Said Commissioner shall also proceed forthwith to collect from such owner or owners, by appropriate proceedings, the amount of such bill.

Sec. 208. *May Make Rules for Construction of Buildings and Control of Employees.*—The Commissioner of Buildings shall institute such measures and prescribe such rules and regulations for the control and guidance of his subordinate officers and employees as shall secure the careful inspection of all buildings while in process of construction, alteration, repair or removal and the strict enforcement of the several provisions of this chapter.

Sec. 209. *May Stop Construction and Wrecking of Buildings.*—Amended by ordinance Dec. 11, 1905, to read as follows:

Said Commissioner shall have power to stop the construction of any building or the making of any alterations or repairs of any building within said city when the same is being done in a reckless or careless manner or in violation of any ordinance, and to order, in writing, or by parole, any and all persons in any way or manner whatever engaged in so constructing, altering or repairing any such building, to stop and desist therefrom.

And the said Commissioner shall have power to stop the wrecking or tearing down of any building or structure within said city when the same is being done in a reckless or careless manner or in violation of any ordinance or in such a manner as to endanger life or property, and to order any and all persons engaged in said work to stop and desist therefrom. When such work has been stopped by the order of said Commissioner, it shall not be resumed until said Commissioner shall be satisfied that adequate precautions will be taken for the protection of life and property, and that said work will be prosecuted carefully and in conformity with the ordinances of the city.

(The penalties prescribed by Section 738, for violations, shall apply with equal force and effect to violations of this section.)

Sec. 210. *Arbitration Appeal from Decision.*—In cases where discretionary power to estimate damage to frame buildings is given the Commissioner of Buildings, as also in questions relating to the security or insecurity of any building or buildings, or parts thereof, and in all other cases where discretionary powers are, by ordinance, given to the Commissioner of Buildings, an appeal to arbitration shall be allowed to parties believing themselves injured or wronged by the decisions of the Commissioner of Buildings, as follows, to-wit:

Sec. 211. *Appeal—Limit of Time Of.*—Any person wishing to make such appeal shall do so within five days after written notice of the decision or order of the Commissioner of Buildings has been given him. An appeal made later than five days after the serving of the notice of the Commissioner of Buildings shall not entitle the appellant to an arbitration. The request for arbitration shall be in writing and shall state the object of the proposed arbitration and the name of the person who is to represent the appellant as arbitrator.

Sec. 212. *Appeal—Cost Of.*—The Commissioner of Buildings shall thereupon state to the appellant the cost of such arbitration, and such appellant shall, within twenty-four hours from the time of filing the original request for arbitration, deposit with the Commissioner of Buildings the sum of money required for defraying the expenses of the same, which sum shall in each case be fixed by said Commissioner in proportion to the difficulty and importance of the case, but shall in no case be more than the cost of similar service in the course of ordinary business of private individuals or corporations. As soon as such sum of money shall have been deposited with him the Commissioner of Buildings shall appoint an arbitrator to represent the city, and the two arbitrators thus appointed shall, if they cannot agree, select a third arbitrator, and the decision of any two of these arbitrators shall, after investigation of the matter in question, be final and binding on the appellant as well as upon the city.

Sec. 213. *Arbitrators to Take Oath—Power to Examine Witnesses.*—The arbitrators shall themselves, before entering upon the discharge of their duties, be placed under oath to the effect that they are unprejudiced as to the matter in question and that they will faithfully discharge the duties of their position. They shall have the power to call witnesses and place them under oath, and their decision or award shall be rendered in writing both to the Commissioner of Buildings and to the appellant from his decision. The fee deposited by the appellant with the Commissioner of Buildings shall be paid by the Commissioner of Buildings to the arbitrators upon the rendering of their report, and shall be in full of all costs incident to the arbitration; but should the decision of said board of arbitration be rendered against the Commissioner of Buildings, then the money deposited by the aforesaid appellant shall be returned to him, and the entire cost of such arbitration shall be paid by the city.

Sec. 214. *In Urgent Cases—Commissioner's Power Final.*—Whenever the decision of the Commissioner of Buildings upon the safety of any building or any part thereof is made in a case so urgent that failure to properly carry out his orders to demolish or strengthen such building or part thereof may endanger life and limb, the decision and order of the Commissioner of Buildings shall be absolute and final.

Sec. 215. *Duty of Police to Assist Commissioner in Enforcing Provisions of This Chapter.*—Whenever it shall be necessary, in the opinion of the Commissioner of Buildings, to call upon the Department of Police for aid or assistance in carrying out or enforcing any of the provisions of this chapter, he shall have the authority so to do, and it shall be the duty of the Department of Police, or of any member of said Department, when called upon by said Commissioner, to act according to the instructions of, and to perform such duties as may be required by, said Commissioner in order to enforce or put into effect the provisions of this chapter.

Sec. 216. *Certificates—Notices—Register.*—The Commissioner of Buildings shall sign or cause to be signed all certificates and notices required to be issued from said Department, and keep a record of the same, and issue or cause to be issued all permits authorized herein. He shall also keep in proper books for that purpose a register of all transactions of the Department of Buildings, which such books shall be open to the inspection of the Mayor, Comptroller, Superintendent of Police, Fire Marshal and members of the City Council at all times.

Sec. 217. *Must Keep Account of Fees Paid—Annual Reports and Estimates.*—Said Commissioner shall keep, in proper books for that purpose, an accurate account of all fees paid, giving the name of the person paying same, date of payment and amount of each such fee. He shall also annually on or before the first day of February, in each year, prepare and present to the City Council a report showing the receipts and expenditures and entire work of his Department during the previous fiscal year, and he shall at the same time send to the Comptroller a full and comprehensive statement of all matters pertaining to his Department, together with an estimate in detail of the appropriations required by the Department during the current fiscal year.

Sec. 218. *Deputy Commissioner of Buildings.*—There is hereby created the office of Deputy Commissioner of Buildings. He shall be appointed by the Commissioner of Buildings according to law. Whenever the Commissioner of Buildings shall make requisition upon the Civil Service Commission of the city for a person to fill the office of Deputy Commissioner of Buildings, he shall notify the Civil Service Commission that the person certified to fill said office should be a competent civil engineer, architect or builder.

Sec. 219. *Duties—Bond.*—Said Deputy Commissioner shall pass upon all questions relating to the strength and durability of buildings; shall examine and approve all plans before a building permit is issued for the construction of any building or structure; shall supervise and have charge of all books and records and the various Inspectors employed in the Department of Buildings; shall receive, examine and file all reports made by them, and shall, under the direction and supervision of the Commissioner of Buildings, assign to such Inspectors the work they are to perform. He shall have a book or books in which shall be recorded the location and character of every building for which a permit is issued, and a copy of every report of inspection made for such building, so arranged that the full history of the various inspections of the building shall appear therein in consecutive order, with the name of each Inspector making the inspection thereof and the date of his report. He shall cause to be kept a record of all complaints of violations of the building ordinances, shall report the same to the Commissioner of Buildings, and shall cause all such complaints to be investigated. He shall act as Commissioner of Buildings in the absence of

the Commissioner of Buildings from his office, and while so acting shall discharge all the duties and possess all the powers invested in or imposed upon the Commissioner of Buildings.

He shall before entering upon the duties of his office execute a bond to the city in the sum of ten thousand (\$10,000) dollars, with such sureties as the City Council shall approve, conditioned for the faithful performance of the duties of his office.

Sec. 220. *Assistant Deputy Commissioner of Buildings—Bond.*—There is hereby created the office of Assistant Deputy Commissioner of Buildings. He shall be appointed by the Commissioner of Buildings according to law. Whenever the Commissioner of Buildings shall make requisition upon the Civil Service Commission of the city for a person to fill the office of Assistant Deputy Commissioner of Buildings, he shall notify the Civil Service Commission that the person certified to fill said office should be a competent civil engineer, architect or builder.

The Assistant Deputy Commissioner of Buildings shall, under the direction of the Commissioner of Buildings or the Deputy Commissioner of Buildings, assist and aid the Deputy Commissioner in the performance of his duties.

The Assistant Deputy Commissioner of Buildings, before entering upon his duties of his office, shall execute a bond to the city in the sum of five thousand (\$5,000) dollars, with such sureties as the City Council shall approve, conditioned for the faithful performance of the duties of his office.

Sec. 221. *Secretary—Duties.*—The Commissioner of Buildings shall appoint a Secretary, according to law, whose duty it shall be to preserve and keep, under the supervision and direction of the Deputy Commissioner of Buildings, all books, records and papers belonging to said office or which are required by law to be filed therein. The Secretary shall deliver to the City Council and to the respective departments all communications from said Commissioner, in writing, and perform such services as may be required by said Commissioner or Deputy Commissioner of Buildings.

Sec. 222. *Chief Building Inspector—Bond.*—There is hereby created the office of Chief Building Inspector. He shall be appointed by the Commissioner of Buildings according to law. Whenever the Commissioner of Buildings shall make requisition upon the Civil Service Commission of the city for a person to fill the office of Chief Building Inspector he shall notify the Civil Service Commission that the person certified to fill said office should be a competent civil engineer, architect or builder.

The Chief Building Inspector shall, under the direction of the Commissioner of Buildings, inspect and examine special cases of violations of the provisions of this chapter, damages to buildings by fire, the elements or accident of any kind whatsoever, and shall perform such other duties as may be required by the Commissioner of Buildings or the Deputy Commissioner of Buildings. The Chief Building Inspector, before entering upon the duties of his office, shall execute a bond to the city in the sum of five thousand (\$5,000) dollars, with such sureties as the City Council shall approve, conditioned for the faithful performance of the duties of his office.

Sec. 223. *Inspectors—Not to Engage in Business.*—The Inspectors of Buildings, after their appointment to office, shall not be engaged in any other business or vocation.

Sec. 224. *Inspectors—Duties—Reports—How Made.*—The said Inspectors shall under the direction of the Commissioner

of Buildings, examine all buildings in the course of erection, alteration, repair or removal throughout the city at least once a week, or as often as may be required for securing efficient supervision, and shall make written reports to said Commissioner as to all violations of any ordinance of the city which the Department of Buildings is required to enforce, together with the street and number where such violations are found, the names of the owner, agent, or lessee, or occupant thereof, and of the architect, contractor and master mechanic, engaged in or about the construction of such building, and all other matters relative thereto as far as they can ascertain them.

Inspectors of Buildings shall file daily reports of their work of inspection, which shall be entered in the books to be kept for that purpose, and which shall be open to official inspection at all times.

Sec. 225. *Inspection—Record Of—How Made.*—The said Inspectors shall examine all buildings and walls reported dangerous or damaged by fire or accident and make a record of such examinations, with the name of the street and number of the building and of the names of the owner, agent, lessee and occupant thereof.

Sec. 226. *Alteration, Enlargement or Raising—Inspection Of—Other Duties.*—The Inspectors of Buildings shall examine all buildings for which an application to raise, enlarge or alter has been made, and shall make a written report upon the condition of the same to the Commissioner of Buildings before the permit is granted. Said Inspectors shall perform such other duties as may be required of them by said Commissioner of Buildings, the rules and regulations of the Department of Buildings, or the ordinances of the city.

Sec. 227. *Powers—Other.*—The Commissioner and Deputy Commissioner of Buildings, as well as the Inspectors of Buildings and of Elevators, are empowered to enter any building, whether completed or in process of erection for the purpose of determining whether the same has been or is being constructed in accordance with the terms of this chapter, and it shall not be lawful to exclude them from such buildings.

Sec. 228. *Elevator Inspectors—Not to Engage in Business—Duties.*—The Inspectors of Elevators shall not, after their appointment to office, be employed or engaged in any other business or vocation.

The Inspectors of Elevators shall perform such duties as may be required of them by the Commissioner of Buildings, the rules and regulations of the Department of Buildings or the ordinances of the city.

ARTICLE II.

PERMITS, PLANS AND FEES.

Sec. 229. *Permits—When Required—Limitations of Time For.*—Amended by ordinance Feb. 26, 1906, to read as follows:

Before proceeding with the erection, enlargement, alteration, repair or removal of any building in the city, a permit for such erection, enlargement, alteration, repair or removal shall first be obtained by the owner or his agent from the Commissioner of Buildings, and it shall be unlawful to proceed with the erection, enlargement, alteration, repair, or removal of any building or of any structural part thereof within the city unless such permit shall first have been obtained from the Commissioner of Buildings. And, if after such permit shall have been granted, the operations called for by the said permit shall not be begun within six months after the date

thereof, or if such operations are not completed within a reasonable time, then such permit shall be void, and no operations thereunder shall be begun or completed until a new permit shall be taken out by the owner or his agent, and fees as herein fixed for the original permit shall be paid for such new permit.

Sec. 230. *Approval of Architects' Plans.*—Amended by ordinance Feb. 26, 1906, to read as follows:

In all cases where a licensed architect shall have completed, signed and affixed his seal to plans, drawings or specifications for any building designed to be erected within the corporate limits of the city, or any structural part thereof, for which a building permit must be procured before the same may be erected, the architect making such plans, drawings, or specifications, shall submit same to the Commissioner of Buildings for examination and approval; and, if the same shall comply with the provisions of this chapter the said Commissioner shall stamp such plans, drawings or specifications in such a manner as to indicate that same have been examined and approved, and the date of such approval, and such stamp shall be preliminary to the final stamp hereinafter provided for.

Said preliminary stamp shall be so affixed before any contract or contracts shall be entered into on behalf of said owner in regard to the construction of said building or buildings on the part of said architect or other person or persons.

Sec. 231. *Permits.—Application For—How Made—How Recorded—Stamped Plans—How Cared For—Return of Same.*—Amended by ordinance Feb. 26, 1906, to read as follows:

Application for such permits shall be made by the owner or his agent to the Commissioner of Buildings. When such application is made, plans and specifications in conformity with the provisions of this chapter, which have been examined and approved by said Commissioner as hereinbefore provided for, shall be filed with the Commissioner of Buildings, who shall then issue a permit and shall file such application, and shall apply to such plans and specifications a final official stamp, stating that the drawings and specifications to which the same have been applied comply with the terms of this chapter. The plans and specifications so stamped shall then be returned to such applicant. True copies of so much of such plans and specifications as may be required in the opinion of the Commissioner of Buildings to illustrate the features of construction and equipment of the building referred to, shall be filed with the Commissioner of Buildings and shall remain on file in his office until the completion or occupation of such building, after which such drawings and specifications shall be returned by the Commissioner of Buildings to the person by whom they have been deposited with him upon demand. It shall not be obligatory upon the Commissioner of Buildings to retain such drawings in his custody for more than three months after the completion or occupation of the building to which they relate.

Sec. 232. *Plans—Essentials Of.*—All such plans and drawings shall be drawn to a scale of not less than one-eighth of an inch to the foot, on paper or cloth, in ink, or by some process that will not fade or obliterate. All distances and dimensions shall be accurately figured, and drawings made explicit and complete, showing the entire sewerage and drain pipes and location of all plumbing fixtures within such building. Each set of plans presented shall be accompanied by a set of specifications describing all materials to be used in the proposed building, and both the plans and specifications

shall be approved by the Commissioner of Buildings before a permit will be granted. No permit shall be granted or plans approved unless such plans shall be signed and sealed by a licensed architect, as provided in "An act to provide for the licensing of architects and regulating the practice of architecture as a profession in the State of Illinois," approved June 3, 1897, provided, that permits may be granted for the erection of buildings of Class III., as hereinafter defined, if such building shall not be more than two stories in height and shall have a superficial area of not more than 1,250 square feet outside dimensions, on plans approved by the Commissioner of Buildings, which plans need not be signed by a licensed architect.

Sec. 233. *Plans—Alterations Upon Stamped Plans Not Permitted Without Permission—Certain Alterations Excepted.*—It shall be unlawful to erase, alter or modify any lines, figures or coloring contained upon such drawings or specifications so stamped by the Commissioner of Buildings or filed with him for reference. If, during the progress of the execution of such work, it is desired to deviate in any manner affecting the construction or other essentials of the building from the terms of the application, drawing or specification, notice of such intention to alter or deviate shall be given to the Commissioner of Buildings, and his written assent shall first be obtained before such alteration or deviation may be made. Alterations in buildings which do not involve any change in their structural parts or of their stairways, elevators, fire escapes or other means of communication or ingress or egress and that are not in violation of any of the provisions of this chapter may be made without the permission of the Commissioner of Buildings.

Sec. 234. *Deposit With Water Department—How Made—Indemnifying Bond—Fees for Water Used.*—Before the Commissioner of Buildings issues a permit as aforesaid he shall require evidence from the applicant that payment has been made to the Bureau of Water of the city for the water to be used or for a water meter for measuring all the water to be used in the construction of such building, under the regulations of the Bureau of Water. Such applicant shall produce evidence that he has filed with and had approved by the Commissioner of Public Works of the City an indemnifying bond protecting the city against any and all damage that may arise to the streets or alleys upon which such building abuts, and to the city and to any person in consequence or by reason of the proposed operations to be authorized by such permit, or by reason of any obstruction or occupation of any street or sidewalk in and about such building operations.

The fees to be paid for water used in connection with the erection of buildings shall be as follows, to-wit:

For water to be used in connection therewith at the rate of five cents for every one thousand bricks, wall measure, used in the construction of a building.

At the rate of six cents for every one hundred cubic feet of rubble stone used in connection therewith.

At the rate of eight cents for every one hundred cubic feet of concrete used in connection therewith.

At the rate of fifteen cents for every one hundred yards of plastering used in connection therewith.

At the rate of five cents for every one hundred cubic feet of hollow tire arch, partition or fireproof covering used in any building.

Sec. 235. *Permits—Cost Of.*—The fees to be charged for building permits shall be as follows: For sheds not exceeding three hundred square feet in area, two dollars; for open shelter sheds, at the rate of fifty cents for each one thousand

cubic feet or part thereof; but in no case shall a permit be issued for a less fee than two dollars.

For all buildings **or structures* other than sheds and open shelter sheds, as hereinbefore described, the fee for the permit shall be at the rate of ten cents for every one thousand cubic feet or fractional part thereof contained therein, the cubic contents being measured to include every part of the building from the basement floor to the highest point of the roof and to include all bay windows and other projections; but in no case shall any permit be issued for a less fee than two dollars, except that for a permit for shingling a roof of any building the fee shall not exceed one dollar.

As amended by ordinance of June 5, 1906.

*As amended Nov. 25, 1907.

Section 1. That Section 235 of the Revised Municipal Code of Chicago of 1905, as amended June 5, 1906, be and the same is hereby amended by inserting in line 6 of said section, after the word "buildings," the words "or structures."

Section 2. This ordinance shall be in force and effect from and after its passage.

As amended Nov. 25, 1907.

Sec. 236. *Permit for Alterations and Repairs—Cost Of.*—The fee to be charged for permits issued for alterations and repairs in or to any building or structure shall be as follows:

Where such alteration or repair shall equal fifty per cent. or more of the original building or structure to be altered or repaired, or of such part or portion of such building or structure to be altered or repaired, the same fees shall be charged as if such permit were for the construction of a new building.

Where such work of alteration or repair shall be less than fifty per cent. of the original building or structure or of the part or portion to be altered or repaired, the fee to be charged for a permit for such work shall be half that charged for the issuance of a permit for new work.

Sec. 237. The fee for a permit to raise a frame building shall be one dollar.

Sec. 238. *Permits for Raising or Moving Buildings Other Than Frame.*—The fee for a permit to raise or move a building other than a frame building shall be two (\$2) dollars for every twenty-five (25) feet, or fractional part thereof, of frontage, and when such building is to be moved from one location to another it shall be altered or reconstructed so as to conform to the ordinances governing the construction of such building at the time of moving the same.

Sec. 238a. *Permit for Wrecking Building.*—Amended by ordinance of Dec. 2, 1907 (Superseding amendatory ordinance of Dec. 11, 1905), to read as follows:

Before proceeding with the wrecking or tearing down of any building or structure, a permit for such wrecking or tearing down shall first be obtained by the owner or his agent from the Commissioner of Buildings, and it shall be unlawful to proceed with the wrecking or tearing down of any building or structure or any structural part thereof within the City unless such permit shall first have been obtained. Application for such permit shall be made by such owner or his agent to the Commissioner of Buildings, who shall issue such permit upon such application and the payment of the fee herein provided for. Such application shall state the location and describe the building which it is proposed to wreck or tear down. The fee for such permit shall be two dollars for every twenty-five feet, or fractional part thereof, of frontage. Upon the issuance of such permit such building may be

wrecked or torn down, provided that all the work done thereunder shall be subject to the supervision of the Commissioner of Buildings, and shall be performed under the same restrictions as govern the erection of buildings.

Any person, firm or corporation engaged in the business of wrecking buildings within the City limits shall file with the City Clerk of the City of Chicago an approved bond in the sum of twenty thousand dollars (\$20,000) to indemnify the City against any lawsuits brought or judgments obtained against the City of Chicago, or any of its officers, resulting from accidents to persons or property during wrecking operations, and shall also procure a contractor's license.

(The penalties prescribed by Section 738, for violations, shall apply with equal force and effect to violations of this section.)

Sec. 239. *Permit—Revocation Of.*—If work in, upon or about any building shall be conducted in violation of any of the provisions of this chapter, it shall be the duty of the Commissioner of Buildings to revoke the permit for the building operation in connection with which such violation shall have taken place. It shall be unlawful, after the revocation of such permit, to proceed with such building operations unless such permit shall first have been reinstated or reissued by the Commissioner of Buildings. Before a permit so revoked may be lawfully reissued or reinstated the entire building and building site shall first be put into condition corresponding with the requirements of this chapter, and any work or material applied to the same in violation of any of the provisions of this chapter shall be first removed from such building.

ARTICLE III.

CLASSIFICATION OF BUILDINGS.

Sec. 240. *Buildings—Classes Of.*—All buildings (other than sheds and shelter sheds, as hereinafter described) now existing or hereafter constructed, altered or enlarged within the city, shall be classified as follows:

Sec. 241. *Class I.*—In Class I shall be included every building used for the sale, storage or manufacture of merchandise, other than department stores, as described in Section 247 of this chapter, and all stables covering or occupying a ground area of over five hundred square feet.

Sec. 242. *Class II.*—In Class II shall be included every office building, hospital and every building used for hotel purposes or for boarding or lodging house purposes where such building so used for hotel or boarding or lodging house purposes is occupied by twenty or more persons.

Sec. 243. *Class III.*—In Class III shall be included every building used as a family residence, also every building used for stabling purposes where such building so used shall occupy a ground area of less than five hundred square feet.

Sec. 244. *Class IV.*—In Class IV shall be included every building used as an assembly hall, whether such hall is used for the purpose of worship, instruction or entertainment, unless such building is used for any of the purposes for which buildings of Class V or Class VIII are used.

Sec. 245. *Class V.*—In Class V shall be included every building which is used as a public theater where an admission fee is charged and in which movable scenery is used; pro-

vided, however, that public halls and club halls with a seating capacity of less than six hundred, although occasionally used for theatrical representations, shall not be construed to be public theaters within the meaning of the term as used in this section, notwithstanding the fact that movable scenery is used upon the stage thereof on such occasions, and such public halls and club halls shall not be considered as buildings of Class V as herein defined. Such public halls and club halls shall be included in Class IV, as defined in Section 244 of this chapter.

Sec. 246. *Class V I.*—In Class VI shall be included every tenement and apartment house; that is to say, any house or building or portion thereof which is used as a home or residence for two or more families living in separate apartments.

Sec. 247. *Class V II.*—In Class VII shall be included all buildings used for the sale at retail of dry goods and other articles of general merchandise and commonly known and described as "department stores."

Sec. 248. *Class V III.*—In Class VIII shall be included every building used exclusively for school purposes.

Sec. 249. *Buildings Used for the Purposes of More Than One Class.*—Where any building is used for the purposes of two or more classes as herein specified and defined, such portion of any such building as is devoted to the uses and purposes of any particular class shall be constructed, operated and maintained in accordance with the requirements of this chapter relating to such class, unless such construction shall prove impracticable or unless there would be a conflict between the provisions of this chapter relating to the construction of buildings; in either of which such cases the provisions relating to and governing the construction of buildings of the class requiring the best and safest form of construction shall govern.

Sec. 250. *Conflict Between Special and General Provisions.*—Whenever any provision or requirement of this chapter relating specifically to the construction, equipment, maintenance or operation of any building or part of a building used for the purposes of any specified class shall conflict with the general provisions of this chapter relating to the construction, operation and equipment of buildings generally, the special provisions shall govern in each case, except in the case of Section 634, which shall govern in all cases coming within its provisions.

ARTICLE IV.

PROVISIONS RELATING SOLELY TO CLASS I.

In Class I shall be included every building used for the sale, storage or manufacture of merchandise other than department stores, as described in Sections 60 and 700, and all stables covering or occupying a ground area of over five hundred square feet.

Sec. 251. *Walls of Class I—Thickness Of.*—The thickness of surrounding walls and of all dividing walls in every building used wholly or in part for the purposes of Class I shall be made as indicated in the following table, to-wit:

	STORIES											
	Basement,	1	2	3	4	5	6	7	8	9	10	11 12
One-story	12	12									
Two-story	16	12	12								
Three-story	16	16	12	12							
Four-story	20	20	16	16	12						
Five-story	24	20	20	16	16	16					
Six-story	24	20	20	20	16	16	16				
Seven-story	24	20	20	20	20	16	16	16			
Eight-story	24	24	24	20	20	20	16	16	16		
Nine-story	28	24	24	24	20	20	20	16	16	16	
Ten-story	28	28	28	24	24	24	20	20	20	16	16
Eleven-story	28	28	28	24	24	24	24	20	20	16	16
Twelve-story	32	28	28	28	24	24	24	20	20	16	16

Provided, however, in buildings of steel skeleton fireproof construction thickness of walls shall be governed by Section 510 of this chapter.

Sec. 252. *Buildings—Height and Construction Of.*—Buildings of Class I which are one hundred feet or more in height shall be built entirely of fireproof construction.

Buildings of Class I less than one hundred feet and more than sixty feet in height shall be built entirely of slow-burning, mill or fireproof construction.

No building of Class I more than five stories in height shall be permitted to be built of ordinary construction.

Sec. 253. *Walls—Exception to Table of Thickness Of.*—If buildings of Class I are erected of less depth than 100 feet from front to rear or between cross walls, or if the walls supporting their floors and roofs are less than twenty-five feet apart, the thickness of the walls given in the aforesaid table may be reduced by four inches, excepting only that no wall in such buildings shall be less than twelve inches thick.

Sec. 254. *Walls—Metal Lath, and Solid Cement Plaster Covering.*—A one or two-story building used for the purposes of Class I, no part of which is within twenty feet of any lot line, alley line or street line, having a complete self-supporting steel frame consisting of wall columns supporting steel trusses, with steel trusses and steel diagonals designed to resist safely within the safe limits of stress provided by this chapter a wind pressure of thirty pounds per square foot for each and every exterior surface exposed to the wind, in addition to the dead weight of the completed structure and in addition to the live load of one hundred pounds per square foot provided for by this chapter and any other live loads which may be imposed on said structure, may have exterior walls measuring not less than one and one-third inches thick of metal, lath or metal fabric plastered on both sides with a mortar consisting only of Portland cement and torpedo sand. A complete reinforced concrete framework built in every manner equally as strong and as safe as provided for a steel frame in this section may have exterior walls built in the same manner of the same materials and of the same thickness.

Sec. 255. *Door Openings at Street Level—Class I.*—The aggregate width of door openings at the street level in buildings of Class I shall be equal to the aggregate width of stairways, as specified in Section 265 of this chapter, and such doors shall not be locked during business hours or while such buildings are occupied by a number of persons for any purpose. Revolving doors shall not be considered as comply-

ing with this section, unless the revolving wings of said revolving doors are so arranged that by the application of a force slightly more than necessary to revolve said doors and which one person of ordinary strength is capable of exerting, all the wings of said doors fold flat on each other and in an outward direction, and unless each side, or the half circles of such revolving doors, are hinged and fastened so as to likewise swing backwards on application of force slightly beyond the normal, and which will permit of exit space for two ordinary persons on either side of the collapsed wings of said revolving doors and their inclosing half circles.

As amended by ordinance March 30, 1906.

Sec. 256. *Buildings of Class I—Increasing Height Of.*—In all cases where buildings of Class I, of ordinary construction, already built, are to be increased in height above the height of sixty feet or above the height of one hundred feet, the additional parts of such buildings shall be constructed as herein provided for buildings over sixty feet high or over one hundred feet high, respectively, and shall be made to conform in all respects and throughout their entire extent to the requirements for buildings of this class more than sixty feet or more than one hundred feet high, respectively, before it shall be lawful to occupy them.

Sec. 257. *Ceilings and Roof of Class I—Space Between.*—In buildings of Class I, if the inclosed space between the ceiling and the roof is of greater average height than two feet, easy and convenient means of access, satisfactory to the fire marshal, shall be given to such space.

Sec. 258. *Fire Walls—In Buildings of Class I.*—Buildings occupied by more than one person or corporation, or for more than one business enterprise conducted by the same person or corporation, in separate inclosures on any one floor, shall have a brick dividing wall for every fifty (50) feet of street frontage if of ordinary construction, or for every eighty (80) feet of street frontage if of slow-burning or mill construction, and such dividing walls shall extend from the front to the rear wall, and such dividing walls, and the doors therein shall be built as dividing walls, and the doors therein are required to be built by the provisions of this chapter.

All of the partitions between the parts of such buildings, occupied by different persons or corporations shall be built of incombustible material from the floor to the floor boards or roof boards next above such story or stories so occupied.

Only metal framed windows glazed with one-quarter inch thick fire-resisting glass may be used in such partitions.

Sec. 259. *Dividing Walls—When Required in Class I.*—Dividing walls will be required in buildings of Class I as follows: For buildings of ordinary construction if their floor area exceeds nine thousand square feet; for buildings of slow-burning or mill construction more than one story in height if their area exceeds twelve thousand square feet; for fireproof buildings more than two stories in height, if their area exceeds twenty-five thousand square feet. In each of the before mentioned cases such buildings shall be subdivided by brick walls built of the thickness given in the table for the thickness of inclosing walls, and all doors and other openings in such walls shall have iron doors or shutters at each side of same. The buildings so subdivided shall be treated as regards stairs and fire escapes the same as two or more separate buildings, provided, however, one-story buildings of ordinary, mill or slow-burning construction or two-story buildings of fireproof construction of any size, used as one store, room or workshop and occupied by only one person or corporation, may be erected without any dividing walls.

Sec. 260. *Dividing Walls and Iron Doors—Openings Inserted In.*—If openings are to be inserted in dividing walls, as before described, or in dividing walls between non-fireproof and fireproof buildings or parts of either of such buildings, they shall be made as follows:

They shall have doors placed on each side of each opening in such walls, which doors shall be made of No. 12 plate iron with a continuous 2 by 2 by one-half-inch angle iron frame extending all around the same and the plate riveted thereto with one-half-inch rivets, placed four inches between centers. If such doors are made double they shall have cross bars, levers and hooks so arranged that when the doors are closed they will be of strength equal to that of a single door. All doors shall be hung on frames made of three-quarter by 4-inch iron stiffened with an angle iron extending all around the same and fitting up snug to the wall. The frames shall be fastened to each other by bolts extending through the wall, such bolts being not more than two feet apart, and such doors shall swing on three hinges and shall be made to fit closely to the frame all around. The sills between the doors shall be of brick, iron, stone or concrete and shall rise at least two inches above the floor on each side of each opening. The lintel over the door shall be made of brick or iron, and the wall between the two door frames shall be covered with a coat of plaster at least one-half inch thick.

Sec. 261. *Elevator Buildings—Bins Of.*—Elevator buildings (which term shall be interpreted as including all buildings intended solely for the receipt, storage and delivery of grain in bulk) may be constructed with the bin walls, both externally and internally, made entirely of wood; provided such walls are made solid and without cellular open spaces within them. The external bin walls shall have a covering of brick or hollow tile not less than twelve inches thick, which shall be united to the bin walls by anchors, in the construction and arrangement of which due allowance is made for the variations of shrinkage of the inclosing wall and of the wooden bin wall. If the weight of the bins is independently carried on a skeleton construction of timber, steel or iron, the first-story walls shall be of brick not less than twenty inches thick. If the outer walls of the outside bins and their facing are not carried on a skeleton construction, then the first-story wall shall not be less than twenty-eight inches thick, or as much thicker as may be required to keep the load upon the brickwork within the limits of stress elsewhere specified in this chapter. Elevator buildings may be built of reinforced concrete and in such case they shall be built according to the provisions of Section 554 of this chapter.

Sec. 262. *Cupola—Inclosing Walls Of—Openings.*—The inclosing walls of cupolas on elevator buildings, if constructed of wood, shall be covered with corrugated iron or other incombustible material.

The outside openings in elevator buildings shall have protections of wire netting made of No. 14 wire, with meshes not over one-half by one-half inch.

All openings in the body of the first story of elevator buildings and the openings in the engine and boiler houses of the same and between these and the main building shall have iron doors made in accordance with the provisions of Section 260 of this chapter.

Sec. 263. *Ventilating Ducts—Chutes—Walls Surrounding.*—Walls surrounding ventilating ducts and rubbish and ash chutes shall be considered in accordance with the regulations governing the construction of smoke flues elsewhere herein contained. Walls around ventilating ducts shall not be less than four inches thick, and when the ventilating duct is larger

than 200 square inches the walls shall be not less than eight inches thick.

Sec. 264. *Store Fronts—Columns and Lintels Supporting.*—The columns and lintels supporting store fronts in buildings within the fire limits of more than one story in height shall be made of incombustible material.

Sec. 265. *Stairs in Buildings of Class I—Number and Width Of.*—Amended by ordinance Nov. 25, 1907, to read as follows:

There shall be in all buildings of Class I of ordinary constructions two flights of stairs not less than three feet wide each. For buildings of ordinary construction of Class I and of greater floor area than three thousand square feet, there shall be six inches added to the width of each such flight of stairs for each additional one thousand square feet of floor area or fractional part thereof up to nine thousand square feet of floor area.

Every Class I building of slow-burning or mill construction less than 4,000 square feet floor area shall have two flights of stairs, not less than three feet wide each, and there shall be six inches added to the width of each such flight of stairs for each additional one thousand square feet of floor area, or fractional part thereof, up to twelve thousand square feet. Provided, however, that additional flights of stairs may be used to make the aggregate width required, instead of widening the two flights above mentioned. It is further provided, however, that such stairs may be reduced one foot in width for each four stories in height or fractional part thereof, above the fourth story of such building, but such stairs shall in no case be of less width than three feet.

For fireproof buildings there shall be required two flights of stairs not less than three feet wide for the first three thousand square feet of floor area, or fractional part thereof. For buildings of more than three thousand square feet and not exceeding five thousand square feet of floor area, there shall be required two flights of stairs each not less than three feet six inches in width. For more than five thousand square feet and less than ten thousand square feet of floor area, there shall be an additional flight of stairs not less than three feet in width. For more than ten thousand square feet and less than fifteen thousand square feet of floor area, each of such stairs shall be of not less width than five feet. For more than fifteen thousand square feet and less than twenty-five thousand square feet of floor area there shall be not less than three stairways of an aggregate width of fifteen feet; none of such stairs shall be of less width than three feet.

The width of the different stairways need not be alike. The width of each stairway in the fifth, sixth, seventh and eighth stories may be six inches less in the clear than the width of the stairways in the first to the fourth stories, inclusive.

The width of each stairway in the ninth, tenth, eleventh and twelfth stories may be twelve inches less in the clear than the width of the stairways in the first of the fourth stories, inclusive.

The width of each stairway in the thirteenth, fourteenth, fifteenth and sixteenth stories may be eighteen inches less in the clear than the width of the stairways in the first to the fourth stories, inclusive, and this reduction in width may be continued in the same ratio in each additional four stories added to the height of the building; provided, however, that no stairways shall have a less clear width than three feet.

All stairways in buildings of Class I shall have a hand rail on each side thereof, and where there is more than one stairway in any building of Class I, such stairways shall be

located at each end of the building, or as far apart from each other as is practicable.

The width of the different stairways need not be alike. The width of each stairway in the fifth, sixth, seventh and eighth stories may be six (6) inches less in the clear than the width of the stairways in the first to the fourth stories, inclusive.

The width of each stairway in the ninth, tenth, eleventh and twelfth stories may be twelve (12) inches less in the clear than the width of the stairways in the first to the fourth stories, inclusive.

The width of each stairway in the thirteenth, fourteenth, fifteenth and sixteenth stories may be eighteen (18) inches less in the clear than the width of the stairways in the first to the fourth stories, inclusive, and this reduction in width may be continued in the same ratio in each additional four (4) stories added to the height of the building; provided, however, that no stairway shall have a less clear width than three (3) feet.

All stairways in buildings of Class I shall have a hand rail on each side thereof, and where there is more than one stairway in any building of Class I such stairways shall be located at each end of the building, or as far apart from each other as is practicable.

Doors and Windows.—When required to be closed, fire-resisting glass. See Section 632.

Limitations in Changing Class of Buildings.—See Section 633.

Buildings Used for the Purposes of More Than One Class.—See Section 249.

Sec. 266. *Courts, Light Shafts and Well Holes.*—Courts, light shafts and well holes shall be built in accordance with the provisions of Section 455 of this chapter.

Sec. 267. *Loads.—Allowance for Live Loads in Construction of Floors of Class I.*—The floors of all buildings of Class I shall be designed and constructed in such a manner as to be capable of bearing in all their parts, in addition to the weight of floor construction, of partitions and permanent fixtures and mechanisms that may be set upon the same, a live load of one hundred pounds for every square foot of surface in such floor; and the strength of such building shall be increased above the capacity to carry each a live load of one hundred pounds per square foot of floor surface when the uses to which such building or part thereof is to be applied involve greater stress.

Sec. 268. *Floors.—Display of Placard Indicating Strength Of.*—It shall be the duty of the owner of every building of Class I already constructed, or hereafter to be constructed, or of his agent, or of the occupant or person in possession, charge or control of the same, to affix and display conspicuously on each floor of such building a placard stating the load per square foot of floor surface which may with safety be applied to that particular floor, or if the strength of different parts of any floor varies, then there shall be such placards for each varying part of such floor. It shall be unlawful to load any such floors, or any part thereof, to a greater extent than the load indicated upon such placards. It shall be the duty of occupants of buildings to maintain such placards during their occupation of the premises, and the owners of buildings, or their agents, to cause the same to be properly affixed with each change of occupation. It shall be part of the duty of architects of all buildings to calculate the figures for such placards, which are to be verified and approved by the Commissioner of Buildings before they are affixed upon the respective floors of the different buildings.

Walls—Ledges.—See Section 588.
Walls.—Around Stairs, Elevators and Shafts. See Section 588.
Walls.—Reinforced concrete. See Section 534.
Towers—Domes—Spires.—See Section 613.

ARTICLE V.

PROVISIONS RELATING SOLELY TO CLASS II.

In Class II shall be included every office building; every hospital and every building used for hotel purposes, or for boarding or lodging house purposes, where such building so used for hotel, hospital or boarding or lodging house purposes is occupied by twenty or more persons.

Sec. 269. *Walls of Class II.*—The thickness of the walls of buildings of Class II shall conform to the following requirements:

The thickness of the enclosing walls of buildings of this class shall be made in accordance with the following table, to-wit:

	STORIES—											
	Basement.	1	2	3	4	5	6	7	8	9	10	11
Basement and	12	8										
Two-story	12	12	8									
Three-story	16	12	12	12								
Four-story	20	16	16	12	12							
Five-story	20	16	16	16	12	12						
Six-story	20	20	16	16	16	12	12					
Seven-story	24	24	20	20	16	16	12	12				
Eight-story	24	24	24	20	20	16	16	12	12			
Nine-story	28	24	24	24	20	20	16	16	12	12		
Ten-story	28	24	24	24	24	20	20	16	16	12	12	
Eleven-story	28	28	24	24	24	20	20	20	16	16	12	12
Twelve-story	32	28	28	24	24	24	20	20	20	16	16	12

Provided, however, in buildings of steel skeleton fireproof construction, thickness of walls shall be governed by the provisions of Section 510 of this chapter.

Sec. 270. *Buildings—Construction Of—Height Of.*—Buildings of Class II which are one hundred feet or more in height shall be built entirely of fireproof construction.

Buildings of Class II less than one hundred feet and more than sixty feet in height shall be built entirely of slow-burning, or mill or fireproof construction. Buildings of Class II not exceeding four stories in height and less than sixty feet in height may be built of ordinary construction.

Sec. 271. *Walls—Division and Partitions in Boarding or Lodging Houses and Hotels.*—In buildings used wholly or in part for boarding houses, lodging houses or hotels, sixty feet or less in height, there shall be for every eight rooms in any one story dividing walls or partitions of incombustible material, separating such eight rooms for the contiguous spaces. Partitions surrounding stairs and corridors shall be made of fireproof material.

Sec. 272. *Stairs in Buildings of Class II.*—Stairs in Buildings of Class II shall be adapted, in number and width, to the area, height and to the uses to be made of the building in which they occur.

For office buildings, by which shall be understood buildings divided into apartments intended for business uses only, and in which there shall be no sleeping apartments whatever, there shall be in buildings of ordinary construction and of less ground area than three thousand square feet, two flights of stairs not less than three feet wide each; for office buildings of ordinary construction and of greater floor area than

three thousand square feet, there shall be six inches added to the width of each such flight of stairs for each additional one thousand feet of floor area, or fractional part thereof, up to six thousand square feet of floor area; for office buildings of ordinary construction and of greater floor area than six thousand square feet, there shall be an additional flight of stairs not less than three feet wide for each additional three thousand square feet of floor area, or fractional part thereof.

For office buildings of slow-burning or mill construction there shall be at least two flights of stairs three feet wide each for the first four thousand square feet of floor area, and there shall be six inches added to the width of each such flight of stairs for each additional one thousand square feet of floor area, or fractional part thereof, up to eight thousand square feet of floor area; and an additional flight of stairs not less than three feet wide shall be required for each additional four thousand square feet of floor area, or fractional part thereof, above eight thousand square feet.

For fireproof office buildings there shall be required one flight of stairs not less than four feet in width for the first three thousand square feet of floor area, or fractional part thereof.

For fireproof office buildings more than three thousand, and not exceeding five thousand square feet of floor area, there shall be required one flight of stairs not less than five feet in width.

For more than five thousand and less than ten thousand, square feet of floor area there shall be required an additional flight of stairs not less than three (3) feet in width.

For more than ten thousand and less than twenty thousand square feet of floor area there shall be required two flights of stairs of not less width than five (5) feet each; provided, that for each and every fireproof office building of more than ten thousand square feet floor area there shall be at least two stairway fire escapes, placed as far apart as practicable, on such buildings, in addition to the standpipe and platform fire escape required by this chapter and the statutes of this state.

An additional flight of stairs shall be required for each additional ten thousand square feet of floor area; provided, that for each additional five thousand square feet of floor area such stairway shall be not less than three feet wide.

And for additional floor areas between five thousand and ten thousand square feet such stairway shall be not less than five feet in width. The width of the different stairways need not be the same.

Sec. 273. *Hospitals, Hotels, Boarding or Lodging Houses—Stairways—Fire Stops.*—For all buildings of Class II of ordinary construction used as hotels, boarding or lodging houses, or hospitals, there shall be required for each building at least two flights of stairs, which, for buildings of three thousand square feet or less in floor area, shall be of not less width than three feet each, with an increase of six inches in width for each additional one thousand square feet of floor area, or fractional part thereof, up to a floor area of five thousand square feet; and after that there shall be an additional flight of stairs not less than three feet wide for each additional two thousand feet of floor area, or fractional part thereof.

For all buildings of Class II of slow-burning or mill construction used as hospitals, hotels, boarding or lodging houses there shall be required for each building at least two flights of stairs, which, for buildings of four thousand square feet or less in floor area, shall be of not less width than three feet each, with an increase of six inches in width for each additional one thousand square feet of floor area, or fractional

part thereof, up to a floor area of six thousand square feet; and after that there shall be an additional flight of stairs not less than three feet wide for each additional three thousand feet of floor area, or fractional part thereof.

For all buildings of Class II of fireproof construction used as hospitals, hotels, boarding or lodging houses, there shall be required for each building at least two flights of stairs, which, for buildings of five thousand square feet or less in floor area, shall be of not less width than three feet each, with an increase of five inches in width for each additional one thousand square feet of floor area up to a floor area of ten thousand square feet, and there shall be required an additional flight of stairs not less than three feet wide for each additional four thousand square feet of floor area, or fractional part thereof.

Each stairway in the fifth, sixth, seventh and eighth stories may be built six (6) inches less in width in the clear than the stairways in the first to the fourth stories, inclusive.

Each stairway in the ninth, tenth, eleventh and twelfth stories may be built twelve (12) inches less in width in the clear than the stairways in the first to the fourth stories, inclusive.

Each stairway in the thirteenth, fourteenth, fifteenth and sixteenth stories may be built eighteen (18) inches less in width in the clear than the stairways in the first to the fourth stories inclusive, and this reduction in width may be continued in the same ratio in each additional four (4) stories added to the height of the building; provided, however, that no stairways shall have a less clear width than three (3) feet.

All stairways in buildings of Class II shall have a hand rail on each side thereof, and where there is more than one flight of stairs in any building of Class II such stairways shall be located at each end of the building, or as far apart from each other as is practicable.

In hotels, hospitals, lodging houses or boarding houses, of other than fireproof construction, there shall be a fire stop of brick, concrete or tile, between the ceiling and floor in each floor of joists for each twenty-five feet, or fractional part thereof, measured in the direction of the length of the joists.

Sec. 274. *Air—Means of Communication With Outer Air in Buildings of Class II.*—Amended by ordinance of Oct. 22, 1906, to read as follows:

In all buildings of this class, the fire escape, stairs, stair halls, entrance halls, bay windows, vent shafts, courts, lights in halls, porches, windows in public halls, shall be of the size and dimensions as are prescribed in Sections 392, 400, 402, 404, 412, 415, 416, 417, 418, 419, 420, 421, 422, and 423 of this chapter relating to buildings of Class VI.

Where vent shafts as defined in Section 389 of this ordinance, are used to ventilate water closet compartments, bath rooms, or pantries, of hotels, office buildings, or club houses, they shall be of the following dimensions:

Building	Square feet	Least width
2 stories	22½	3 feet
3 stories	27	3 feet
4 stories	36	3 feet
5 stories	48	5 feet
6 stories	72	6 feet
7 stories	96	8 feet
8 stories	120	8 feet

In every hotel, office building, or club house, hereafter erected, and every hotel, office building, or club house, which shall be increased or diminished in size, or otherwise altered after its erection, and in every building, now or hereafter in

existence, not now used as a hotel, office building or club house, but hereafter constructed or altered to such use, and every habitable room, excepting water closet compartments, bathrooms and pantries, shall have at least one window opening directly upon a street, alley, yard, or court. The total area of the windows opening from any such room (other than water closet compartments, bathrooms and pantries), shall be, at least one-tenth the floor area of that room, and the top of, at least, one window shall be not less than seven feet above the floor, and the upper half of that window shall be made so as to open its full width. No window in any such room (other than pantries, water closet compartments and bath rooms), shall have less than ten square feet of glass area. Every such water closet compartment, bathroom or pantry, shall have a window not less than one foot wide and of an area of, at least, four square feet for a floor area of forty-five square feet or less, opening directly into the outer air, or special light or air shafts, into which no other rooms, or compartments, other than toilet compartments, bathrooms, or pantries, are ventilated. For upwards of forty-five square feet of floor area there shall be a window area of at least one-tenth of the floor area. The windows in all cases shall be arranged so as to admit of their being opened at least one-half of their height. The urinal, bath or water closet compartments on the top floor of any building may be lighted and ventilated by means of a skylight and ventilator. The area of the skylight shall conform to the above specified areas for windows.

It is provided that in hotels, office buildings and club houses, the bathroom, water closet and urinal compartments, may be ventilated by exhausting the air from the same at the rate of at least six complete changes of air from each room per hour by approved positive mechanical means through special air ducts to the outer air. The special ventilating duct or ducts, together with their branches, shall be of such size or sizes as to provide for the required changes of air from each of such rooms.

It shall be the duty of the owner, agent, architect, or of the party in possession or control of the same to notify the Commissioner of Health in writing twenty-four hours in advance when any such system is completed, for the supervision of the test.

When the installation of the mechanical ventilating system for toilet and bathrooms is complete, and the ventilating appliances are being operated at their normal capacities, they shall be tested by the party notifying for test for volumetric efficiency in the presence of, and under the direction of, the Chief Sanitary Inspector of the Department of Health.

The mechanical ventilating system shall at all times be kept in good repair and in operation to insure the required ventilation during the hours when the above specified buildings are used for human occupancy.

All such toilet or bathrooms as mentioned in this section, shall have a fixed window, or windows, having a gross glass area and equal to at least one-eighth of the floor area of rooms. The windows are to be provided and placed in the dividing or enclosing partitions, and shall be suitably arranged so as to admit of natural light from an adjoining room which has direct communication to the outside air. All such rooms or compartments shall have proper means for artificially lighting the same, and they shall be properly and adequately lighted by natural or artificial means during the occupancy of the building.

Sec. 275. *Joists—Supports For.*—If in buildings of Class II the distance between the enclosing walls is more than twenty-four feet in the clear, there shall be intermediate sup-

ports for the joists, which supports shall be either brick walls or iron or steel columns and beams or trusses or girders. If brick walls are used for this purpose, they may, in all cases where the thickness of walls is given in the table as sixteen inches or more, be made four inches less in thickness than the dimensions stated in the table.

Sec. 276. *Loads—Allowance for Live Loads in Construction of Floors of Class II.*—For all buildings of Class II the floors shall be designed and constructed in such manner as to be capable of bearing in all their parts, in addition to the weight of the floor construction, partitions and permanent fixtures and mechanisms that may be set upon the same, a live load of fifty pounds for every square foot of surface in such floors.

Sec. 277. *Stalls or Rooms of Class II—When Considered Habitable.*—In buildings of Class II no room shall be considered habitable or used as a habitation unless it has at least one window of an area equal to one-tenth of the superficial area of such room, opening into the external air. Provided, however, that no stall or compartment used as a sleeping room in a building, the walls of which stall or compartment do not extend within a distance of two and one-half feet from the ceiling thereof, shall be regarded and considered to be a room within the intent and meaning of the provisions hereof, but the walls of every such stall or compartment shall be of incombustible material.

Sec. 278. *Hospitals—Construction—Height Of—Permits—Special Consents.*—It shall be unlawful for any person or corporation to build, construct, maintain, conduct or manage in any block, if two-thirds of the buildings fronting upon both sides of the streets bounding such block or square are devoted chiefly to residence purposes, any hospital for the care, treatment or nursing of three or more insane persons; or any hospital for the care, treatment or nursing of three or more inebriates; or persons suffering from the effect of the excessive use of alcoholic liquors; or any hospital for the care, treatment or nursing of three or more epileptics; or any hospital for the care, treatment or nursing of any person affected with any infectious or contagious disease, unless the owners of a majority of the frontage in such block or square, and in addition thereto the owners of a majority of the frontage on the opposite sides of the streets bounding such block or square, consent in writing to the building, constructing, maintaining, managing or conducting of any such hospital in such block or square. Such written consents of the majorities of such property owners shall be filed with the Commissioner of Buildings, and an exact copy of same shall be filed with the Commissioner of Health before a permit shall be granted for the building or constructing, or a license issued for the maintaining, conducting or managing of any such hospital. Provided, that any building that may be used for hospital purposes which is over two stories in height shall be of fireproof construction throughout, and no hospital shall be built to exceed six stories in height.

Sec. 279. *Hospitals—Location of Near School Houses.*—No hospital of any kind or description hereafter erected or established shall be erected or established within four hundred feet of property used for school purposes. (Note: This section is repealed by ordinance of June 1, 1908, page 509, governing hospitals, [Sections 1102, etc.])

Walls—Ledges—Joist Supports.—All ledges in walls shall be as specified in Section 588 of this chapter.

Walls.—Reinforced concrete. See Section 554.

Sec. 280. *Roofs—Strength Of.*—The roofs of buildings of Class II shall be designed and constructed as is required in Section 610.

Roofs—Shingle.—See Section 609.

Towers, Domes and Spires—Construction Of.—See Section 613.

Skylights—Construction, Glass In.—See Section 614.

Bay Windows and Light Shafts.—Material for. See Section 600.

Doors and Windows.—When required to be closed.—Fire resisting glass. See Section 632.

Wind Pressure.—Precautions against. See Section 603.

Windows.—Cleaning, safety devices. See Section 726.

Buildings Used for the Purposes of More than One Class.—See Section 249.

Limitations in Changing Class of Buildings.—See Section 633.

Walls—Around Stairs, Elevators and Shafts.—See Section 588.

ARTICLE VI.

PROVISIONS RELATING SOLELY TO CLASS III.

In Class III shall be included every building used as a family residence; also every building used for stabling purposes, where such building so used shall occupy a ground area of less than five hundred square feet.

Section 281. *Walls of Class III—Thickness of.*—Buildings of Class III. shall conform to the following requirements:

The thickness of enclosing walls of buildings of this class shall be in accordance with the following table, to-wit:

	STORIES											
	Basement.	1	2	3	4	5	6	7	8	9	10	11 12
Basement and	12	8									
Two-story	12	12	8								
Three-story	16	12	12	12							
Four-story	20	16	12	12	12						
Five-story	20	16	16	16	12	12					
Six-story	20	20	16	16	16	12	12				
Seven-story	24	24	20	20	16	16	12	12			
Eight-story	24	24	24	20	20	16	16	12	12		
Nine-story	28	24	24	20	20	20	16	16	12	12	
Ten-story	28	24	24	24	20	20	20	16	16	12	12
Eleven-story	28	28	24	24	24	20	20	20	16	16	12
Twelve-story	32	28	28	24	24	24	20	20	20	16	16

Provided, however, in buildings of steel skeleton fireproof construction, thickness of walls shall be governed by the provisions of Section 510 of this chapter.

Sec. 282. *Buildings—Construction Of—Height Of.*—Buildings of Class III which are one hundred feet or more in height shall be made entirely of fireproof construction.

Buildings of Class III less than one hundred feet and more than sixty feet in height shall be built entirely of slow-burning mill or fireproof construction.

Buildings of Class III less than sixty feet in height may be built of ordinary construction.

Sec. 283. *Skylights—Construction Of—Glass In.*—The skylight on the roof of any building of Class III other than a frame building, shall have the sides, sashes and frames constructed of metal, or of wood metal clad on all exterior

surfaces. If the building exceed three stories in height, such skylight shall have at least six inches over same a strong wire netting twice not lighter than No. 8 and mesh not coarser than $1\frac{1}{2} \times 1\frac{1}{2}$ inches), unless the glass contains a wire netting within itself.

Sec. 284. *Loads.—Allowance for Live Loads in Construction of Floors of Class III.*—For all buildings of Class III the floors shall be designed and constructed in such manner as to be capable of bearing in all their parts, in addition to the weight of floor construction, partitions and permanent fixtures and mechanisms that may be set upon the same, a live load of forty pounds for every square foot of surface in such floors.

Sec. 285. *Rooms of Class III—When Considered Habitable.*—In buildings of Class III, no room shall be considered habitable or used as a habitation unless it has at least one window of an area equal to one-tenth of the superficial area of such room opening into the external air.

Sec. 286. *Fire Walls—Thickness Of—When Dispensed With.*—In buildings of Class III, fire walls of brick not less than twelve inches thick shall be built, extending above the roof thereof, if such roof is flat, and also above the roof of such building where the same abuts against another building, or where the same stands upon any line of any lot, excepting street or alley lines. Provided, that where eight-inch walls are permitted in the top story of buildings, or where the building is not over three stories high, the fire walls may be eight inches thick. Such fire walls, where they stand upon lot lines or where they are over the dividing walls between buildings, or over the dividing walls in the interior of buildings, where such are required by the provisions of this chapter by reason of the great area of such buildings, shall extend at least two feet above the roof of such buildings. Fire walls upon street and alley lines shall extend not less than eighteen inches above the roofs of such buildings. Fire walls may be dispensed with on street and alley lines, if the tops of the roof boards and roof joists are protected against fire for a distance of at least five feet from such street or alley lines by a coating of mortar or hollow tile or porous tile at least two inches thick. Fire walls at street and alley lines may also be dispensed with in all cases where the entire framing and material of the roof is made strictly fireproof.

Walls facing upon courts and light shafts shall be treated as in the same category with walls facing upon streets and alleys.

Fire walls shall be covered with a weather proof coping of incombustible material.

Sec. 287. *Bay Windows and Light Shafts—Material For.*—Bay or oriel windows and light shafts may be built of combustible material in buildings of Class III of two stories or less in height, provided, such bay and oriel windows or light shafts shall not have a greater width than twelve feet at wall line of building, and, provided, that the outside walls, roofs and soffits of such bay or oriel windows and light shafts, when so constructed, shall be covered with sheet metal or other incombustible material. In all other cases, bay and oriel windows and light shafts and their supports shall be constructed entirely of incombustible material.

Sec. 288. *Walls—Brick Wall Upon Wooden Sills—Level of Sills Allowed.*—All buildings of Class III not exceeding one story in height and twenty feet in height from top of sills to highest point of roof, and with side walls not exceeding fourteen feet in height, and with floor area not exceeding one thousand two hundred square feet, may have

brick walls not less than eight inches in thickness erected on wooden sills, the sills supported on iron, masonry or concrete supports extending four feet below the surface of the ground. The foundations under such supports shall be of concrete, stone or brick, each covering not less than five square feet area and not more than eight feet apart to support the weight that may rest upon them with safety; sills shall be placed not higher than four feet above the established grade of the street upon which the lot fronts, and upon which lot the building is erected, where grades are established, and not exceeding seven feet above the ground where grades are not established. In all cases of buildings being more than one story and less than two stories high, and having a gable or hip roof of not less than one-third ($\frac{1}{3}$) pitch, 8 inch walls on solid brick or stone masonry may be used, provided they do not exceed 14 feet in height measured from the first floor joist, and provided such buildings have a floor area not exceeding one thousand two hundred (1,200) feet, and are not over twenty-two feet in width.

Roofs—Strength Of. See Section 610.

Roofs—Shingle and Gravel. See Section 609.

Wind Pressure. Precautions against. See Section 603.

Walls—Reinforced Concrete. See Section 554.

Walls—Ledges. See Section 588.

Towers, Domes and Spires. See Section 613.

Limitations in Changing Class of Buildings. See Section 633.

ARTICLE VII.

PROVISIONS RELATING SOLELY TO CLASS IV.

In Class IV shall be included every building used as an assembly hall, whether such hall is used for the purpose of worship, instruction or entertainment, unless such building is used for any of the purposes for which buildings of Class V or Class VIII are used.

Sec. 289. *Walls—Outside Walls of Class IV—Structures Built Above—Walls Of.*—The outside walls of every building used wholly or in part for the purposes of Class IV the roof or ceiling of which is carried on trusses or girders of a span of fifty feet or more, shall be as follows:

If such walls are less than twenty-five feet high, not less than twenty inches thick.

If they are more than twenty-five feet high and less than forty-five feet high, they shall not be less than twenty-four inches thick.

If they are more than forty-five feet and less than sixty feet high, they shall not be less than twenty-eight inches thick.

If they are more than sixty feet and less than seventy-five feet high, they shall not be less than thirty-two inches thick.

If they are more than seventy-five feet and less than ninety feet high, they shall not be less than thirty-six inches thick.

An increase of four inches in thickness of such walls shall be made in all cases where they are over one hundred feet long without cross walls of equal height.

Walls around stairs, elevators and shafts. See Section 588.

For rooms used for the purposes of Class IV where such rooms are less than fifty feet wide in the clear, the thickness of the walls enclosing or surrounding such rooms may be reduced by four inches.

The outside walls of every building of Class IV the roof or ceiling which is not carried on trusses or girders, shall be of the same thickness as in buildings of Class I.

If one or more stories are built above the room or rooms, or portion of any such building devoted to the uses of Class

IV and such stories are carried on trusses or girders, the thickness of walls shall be increased by four inches for each two stories or part thereof above every such room.

If solid masonry buttresses are employed, and placed eighteen feet or less apart, and extended to the foot of the trusses or girders carrying the ceiling, or if iron or steel pillars are inserted in such walls for the support of the superstructure, and at distances not more than twenty-four feet between centers, and if such pillars extend to and carry the superimposed trusses and girders, the thickness of such walls may be reduced in proportion to the increase of strength afforded by such buttresses or pillars; but in no case shall any such wall be less than twelve inches thick in the top story; four inches shall be added, going downward, for each story, or for each twenty-five feet in height of wall. Provided, that if in any building of this class now in existence the structural parts thereof do not comply with the foregoing requirements, and structural changes are made therein, then all walls, columns or other structural parts shall be strengthened in a manner satisfactory to the Commissioner of Buildings.

Sec. 290. *Walls—Columns In.*—If iron or steel columns are introduced in such walls, the brickwork around the same shall be bonded into that of the connecting walls, and each of such columns shall be fireproofed, as provided in Section 511 of this chapter.

Sec. 291. *Frontage of Class II'—Seating Less Than 800.*—Buildings of Class IV containing halls or rooms of an aggregate seating capacity of eight hundred persons or less, shall have for each hall or room a frontage upon two public spaces, of which at least one shall be a street, and of which the other, if it is not a street, shall be a public or private alley, not less than ten feet wide, opening directly on a public street.

Sec. 292. *Frontage of Class II'—Seating Over 800.*—Buildings of Class IV containing halls or rooms used for the purposes of Class IV of greater aggregate seating capacity than eight hundred, shall have for each such hall or room a frontage upon three open spaces, of which at least one shall be a public street, while the two others, if not streets, shall be public or private alleys of a width of not less than ten feet each, opening directly on a public street, or fireproof passageways or tunnels of not less than seven feet each in width may be used in place of these alleys, provided, such passageways or tunnels lead to a public thoroughfare.

Sec. 293. *Buildings, Class IV—Construction Of.*—Amended Dec. 11, 1905, to read as follows:

Buildings of Class IV containing halls of an aggregate seating capacity of not more than eight hundred, may be built of ordinary construction. If such halls have a greater aggregate seating capacity than eight hundred (800) and less than one thousand five hundred (1,500), such building shall be built of mill, slow-burning, or fireproof construction. If such hall have an aggregate seating capacity of one thousand five hundred (1,500) or more, such buildings shall be built entirely of fireproof construction, provided that buildings mainly used for exposition or exhibition purposes, and not exceeding two stories in height, or having for public use only a main floor and one gallery, and which have their outside walls and structural members of incombustible material and which comply in all other respects with this ordinance, may have their temporary seats, boxes, showcases, platforms, or booths, constructed of combustible material.

In computing the seating capacity of any room or building used for the purposes of Class IV in which the seats are not fixed, an allowance of eight square feet of floor area shall be made for each person, and all space between the walls or partitions of such room or building shall be measured in this computation. Provided, that in church buildings not having more than two stories and each floor having its own separate exits and standing free from all buildings, the seating capacity of each floor shall be estimated alone as determining the kind of construction under this article.

Distance of said building from any other structure or building, to be at least seven feet on all sides.

As amended February 4, 1907.

Sec. 294. *Buildings of Class II' Used Partly for Other Purposes.*—Any building occupied wholly or in part for the purposes of Class IV shall be built entirely of fireproof construction, if the halls or rooms used for the purposes of Class IV therein have an aggregate seating capacity greater than one thousand five hundred.

Sec. 295. *Buildings of Certain Height—Construction Of.*—Any building higher than sixty feet and connected with or made part of any building used wholly or in part for the purposes of Class IV shall be entirely of fireproof construction. Any such building less than sixty feet in height shall, if its case is not already covered by other provisions of this chapter, be made of fireproof, slow-burning or mill construction.

Sec. 296. *Opening Between Non-Fireproof Buildings.*—In all cases where fireproof construction is not used for the whole of two or more connected buildings, used wholly or in part for the purposes of Class IV there shall be at each connecting opening double iron doors.

Sec. 297. *Spires, Cupolas and Domes Upon Houses of Worship—Isolation—Spire, etc., to be Taken Down—Roofs of Isolated Buildings of Class IV.*—Spire, cupolas or domes with a framework of non-fireproof material and covered on the outside with incombustible material, may be erected as part of any house of public worship, and if such house of worship is so built that it is nowhere nearer than twenty feet to any line of the lot upon which it stands (street and alley lines excepted), such non-fireproof spires, cupolas or domes may be maintained only while this intervening space of twenty feet is maintained unoccupied as part of the grounds or premises belonging to such house of public worship. If the conditions of such building be so changed that there shall not be a vacant space as hereinbefore required surrounding same, such spire, cupola or dome shall be forthwith taken down.

The roofs of isolated buildings, occupied for purposes of Class IV shall be constructed in the same manner as that provided for spires, domes and cupolas.

Provided, however, that the roofs of houses of worship outside the fire limits not exceeding twenty-eight hundred square feet in area may be covered with shingles.

Sec. 298. *Floor Levels—Limitation of Floor Levels of Class II'—Auditorium Floor of Class IV—Height Above Sidewalk—Stairs.*—The following limitations of floor levels in buildings occupied either wholly or in part for purposes of Class IV shall be observed in all cases.

In buildings occupied either wholly or in part for purposes of Class IV no auditorium of a greater seating capacity than one thousand shall have the highest part of its main floor at a greater distance than ten feet above the adjacent sidewalk

grades. No room or rooms used for the purposes of Class IV of greater seating capacity than five hundred, shall be at a greater distance above the sidewalk grade than thirty feet. No room or rooms used for the purpose of Class IV of greater seating capacity than two hundred, shall be at a higher level above the sidewalk grade than forty-five feet.

Provided, however, that in the case of a building used either wholly or in part for the purposes of Class IV and built wholly of fireproof construction, a room or rooms to be used for the purposes of Class IV and of an aggregate seating capacity of less than five hundred, may be located in any story thereof, but in such case there shall be at least two separate and distinct flights of stairs from the floor or floors in which such room or rooms are located to the ground, each of which stairs shall be not less than four feet wide in the clear.

Sec. 299. *Loads, Allowance for Live Loads in Construction of Floors of Class IV—Stairways—Entrances and Exits, Width Of.*—All floors of all buildings of Class IV shall be designed and constructed in such a manner as to be capable of bearing in all their parts, in addition to the weight of floor construction, partitions and permanent fixtures and mechanisms that may be set upon the same, a live load of one hundred pounds for every square foot of surface in such floor. The width of stairways in buildings used wholly or in part for the purposes of Class IV shall be eighteen inches for every one hundred of the aggregate seating capacity of all rooms in such building, which are used for the purposes of Class IV and for fractional parts of each one hundred seating capacity a proportionate part of eighteen inches shall be added to the width of such stairways, but no stairway in such building shall be less than four feet wide in the clear, except as hereinafter provided; and provided, further, that in any such building having a room or rooms used for purposes of Class IV the aggregate seating capacity of which shall not exceed two hundred and fifty persons, two separate and distinct three-foot stairways shall be permitted.

All stairways shall have hand railings on each side thereof. Stairways which are over 7 feet wide shall have double intermediate handrails, with end newel posts at least 5½ feet high. No stairways shall ascend a greater height than thirteen feet six inches without a level landing, which, if its width is in the direction of the run of the stairs, shall not be less than three feet wide, or which, if at a turn of the stairs, shall not be of less width than the width of the stairs.

Stairways leading to a box or boxes, seating not to exceed thirty people in the aggregate, shall be independent of all other stairs or seats and not less than two feet six inches wide in the clear. For each additional twenty-five of seating capacity, or major portion thereof, in such boxes, an additional width of five inches shall be added to such stairways.

Walls—Ledges.—See Section 588.

Doors and Windows—When Required to Be Closed—Fire-Resisting Glass.—See Section 632.

Sec. 300. *Balconies and Galleries—Exit and Entrance.*—Distinct and separate places of exit and entrance shall be provided for each gallery. A common place of exit and entrance may serve for the main floor of the auditorium and the balcony, provided its capacity be equal to the aggregate capacity of all aisles or corridors leading from the main floor and such balcony to such place of exit and entrance.

Sec. 301. *Balconies and Galleries—Designation Of.*—Where there are balconies or galleries, the first balcony or

gallery shall be designated the "Balcony," and the second and third balcony or gallery shall be designated, respectively, "Gallery" and "Second Gallery." Such designation shall be plainly printed on all admission tickets.

Sec. 302. *Aisles—Steps in Aisles—Passageways—Kept Unobstructed—Width of Corridors, Passages, Hallways and Doors.*—Aisles in rooms or auditoriums used for the purposes of Class IV shall in the aggregate be eighteen inches in width for each one hundred of the seating capacity of such room or auditorium, and for fractional parts of one hundred, a proportionate part of eighteen inches shall be added; but no aisle shall be less than two feet and six inches in width in its narrowest part.

Steps shall be permitted in aisles only as extending from bank to bank of seats, and whenever the rise from bank to bank of seats is less than five inches the floor of the aisles shall be made as an inclined plane, and where steps occur in outside aisles or corridors, they shall not be isolated, but shall be grouped together and there shall be a light so placed as to illuminate such steps in such outside aisles or corridors. All aisles and passageways in such rooms or auditoriums shall be kept free from camp stools, sofas, chairs and other obstructions, and no person shall be allowed to stand in or occupy any of such aisles or passageways during any performance, service, exhibition, lecture, concert, ball, or any public assembly.

Sec. 303. *Corridors, Passageways, Hallways and Doors—Width Of.*—The width of corridors, passageways, hallways and doors adjacent to, connected with or a part of such rooms or auditoriums, shall be computed in the same manner as is herein provided for stairways and aisles, excepting, however, that no such corridor, passageway or hallway shall be anywhere less than four feet in width, and no such door shall be less than three feet in width.

Sec. 304. *Seats—Number of in Rows.*—There shall not be more than fourteen seats in any one row between aisles.

Rows of seats shall not be less than 2 feet 8 inches from back to back, and no bank of seats shall be of greater rise than 24 inches.

Sec. 305. *Emergency Exits.*—Emergency exits and stairways shall be provided outside of the walls of all assembly halls of a larger seating capacity than eight hundred. Provided, however, that if any such assembly hall is used for any of the purposes described in Section 311 of this chapter, and has a seating capacity of more than four hundred, such assembly hall shall have emergency exits to the street of one-half the aggregate width of the main exits, but no such emergency exit shall be less than three feet in width.

Such emergency exits and stairways therefrom may be built inside the walls of the building in a corridor or passageway not less than seven feet wide, which corridor or passageway shall be surrounded by a fireproof partition, not less than four inches thick.

Such stairways shall be made of wrought iron or steel, or other approved fireproof material and cast iron is not approved for this work. All emergency exits and stairways therefrom shall be kept free from obstruction of any kind, including snow and ice.

Sec. 306. *Doors to Open Outward.*—All doors affording access directly or indirectly to the street from any room used for the purposes of Class IV shall open outward upon suitable hinges.

Exit doors from such rooms shall not be obscured by draperies and shall not be locked, or fastened, in any manner

during the entire time any such room is open to the public, but shall be so constructed and maintained that they may be easily opened from the interior.

Sec. 307. *Walls Between Auditorium and Stage.*—In buildings used either wholly or in part for the purposes of Class IV hereafter erected, there shall be a solid brick wall, of the same thickness as that called for on the outside walls, between the auditorium and stage; and in non-fireproof buildings such walls shall extend to a height of three feet above the roof. Provided, however, that in existing buildings, any room used for the purposes of Class IV and having a seating capacity greater than four hundred, shall have the proscenium wall built of incombustible material.

Sec. 308. *Curtain Shall Be Iron, Steel or Asbestos—Inspection Of—Fee.*—The main curtain opening in any such room shall have a wrought iron or steel or asbestos curtain, which shall be inspected by the building department semi-annually, for which inspection a charge of two dollars shall be made, and all other openings in the proscenium wall shall have self-closing iron doors.

Sec. 309. *Structures Over Ceiling—Construction.*—If any structure is built over the ceiling or roof of any building used either wholly or in part for the purposes of Class IV the different members of the girders or trusses supporting same shall have their fireproofing double, in the manner required for columns for fireproof buildings of Class I.

Sec. 310. *Fire Apparatus on Stage.*—In all rooms used for the purpose of Class IV of a seating capacity of two hundred and fifty or more, where stationary scenery is used, there shall be kept for use two or more portable fire extinguishers or hand fire pumps on and under the stage, and also four fire department axes, two fifteen-foot hooks and two ten-foot hooks on each tier or floor of the stage, subject to the approval of the Fire Marshal, and in such rooms of less seating capacity than two hundred and fifty, there shall be at least one portable fire extinguisher.

Sec. 311. *Rooms Used for Regular Theatrical or Vaudeville Performances—Exit Doors—Fireman—Employment Of—Duties.*—Amended by ordinance June 8, 1908, to read as follows:

Exit doors shall not be obscured by draperies and shall not be locked or fastened in any manner during the entire time any such room of Class IV is open to the public, so as to prevent them from being easily opened outwardly; and such doors shall be so constructed and maintained as to require no special knowledge or effort to open them from the interior.

It shall be the duty of every person, firm or corporation conducting, operating or maintaining any room having a seating capacity of three hundred or more, used for the purposes of Class IV and which is used regularly for theatrical or vaudeville performances, and where an admission fee is charged, to procure at his, their or its own expense the attendance at each and every performance of one fireman who shall be detailed by the Fire Marshal from the regular City Fire Department; he shall be in the uniform of the Chicago Fire Department and he shall be on duty at such place wherein such theatrical or vaudeville performance is given during the entire time it is open to the public. He shall report to and be subject to the orders of the Fire Marshal and shall see that all fire apparatus required by this Chapter is in its proper condition, ready for use, and that all exit doors are unlocked during the entire time such building

is open to the public, and are all in efficient and ready working order.

Such fireman and the Fire Marshal shall require all persons employed in or about such room to be drilled in the use of all apparatus and appliances for the prevention of fire installed therein, at least twice in every week, and such fireman shall report to the Fire Marshal the manner and efficiency of such drill. Such fireman shall report in writing daily to the Fire Marshal the condition and equipment of the building, or portion thereof, to which he is detailed. No fireman shall be on duty at any one building for a longer period than two weeks.

The compensation to be paid to the city for the services of such city fireman so detailed shall be based on the regular salary paid by the city to such fireman and shall be computed according to the ratio between the number of hours such fireman is required by his duties hereunder to devote to such theater and the total number of hours such fireman is employed by the city for all purposes. All sums received by the city under the provisions of this section shall be for the use and benefit of the Fire Department.

Sec. 312. *Standpipe and Hose on Stage.*—A standpipe not less than one and one-half inches in diameter, with a hose connection and hose valve therein, shall be installed on each side of the stage in such room, and shall at all times have a hose connected thereto, ready for use.

Such standpipe shall be connected with a power pump or gravity tank so that a sufficient pressure of water shall be furnished through such standpipe to afford adequate fire protection. The pressure to be furnished by such tank or pump shall be satisfactory to the Fire Marshal.

Sec. 313. *Vents or Flue Pipes.*—One or more vents or flue pipes of metal construction or other incombustible material approved by the Commissioner of Buildings shall be built over the stage, and shall extend not less than ten feet above the highest point of the roof, and shall be equivalent in area to one-twentieth of the area of the stage.

In buildings where additional stories are built above the stage, such vents or flue pipes may be carried out near the top of the stage walls, and shall be continued and run up on the exterior of the building to a point five feet above the highest point of the additional stories.

All such flues or vents shall be provided with metal dampers, and shall be opened by a closed circuit battery, approved by the City Electrician.

Such dampers shall be controlled by two switches, one at the Electrician's station on the stage, which station shall be fireproof, and the other at the city fireman's station on the opposite side of the stage; such switches shall be located in such places on the stage as may be designated by the Fire Marshal, and each switch shall have a sign with plain directions as to the operation of same printed thereon.

Sec. 314. *Fuse Boxes.*—All fuse boxes shall be surrounded by two thicknesses of fireproof material, with an air space between, and no fuse shall be exposed to the air between the switchboards; all electrical equipment in such rooms shall be installed and maintained to the satisfaction and approval of the City Electrician.

Sec. 315. *License.*—The amusement license for each room used for the purposes of Class IV shall state the number of persons such room has accommodations for, which number shall be governed by the provisions of this chapter relating thereto, and no more than that number shall be allowed to be in such room at any one time.

No amusement license shall be issued for any room used for the purposes of Class IV unless the Commissioner of Buildings, the Fire Marshal and the City Electrician shall first have certified, in writing, that such room complies with the provisions of this chapter in every respect.

Sec. 316. *Exits—Diagram of, Printed on Programs—Signs Over.*—It shall be the duty of the owner, lessee, or manager of every room used for the purposes of Class IV and in which programs are issued for performances given therein, to cause to be printed on such programs a diagram showing conspicuously the exits from such room. The word "Exit" shall be in letters at least six inches high over the opening to every means of egress from any such room, and in any such room having a greater seating capacity than four hundred, a red light furnished by gas or sperm oil shall be kept burning over such word during the entire period such room is open to the public and until the audience has left such room.

Sec. 317. *All Parts of Room Well Lighted During Performance.*—Every portion of any room used for the purposes of Class IV and all outlets therefrom leading to the streets, including the passageways, courts and corridors, stairways, exits and emergency exit stairways, shall be well and properly lighted during every performance, and the same shall be kept so lighted until the entire audience has left the premises; and every passageway, or court, or corridor, or stairway, or exit, or emergency exit stairway, shall be provided with signs, indicating the way out of the building, the letters of which shall not be less than six inches in height.

Sec. 318. *Lights in Halls, Corridors and Lobbies, Control of—Separate Shut-Off—Connection with Gas Mains—Protection of Suspended and Bracket Lights—Protection of Lights Inserted in Walls—Protection of Foot Lights—Construction of Border Lights—Ducts and Shafts Conducting Heated Air from Lights—Protection of Stage Lights.*—All gas or electric lights in the halls, passageways, corridors, lobby or other means of ingress to or egress from any such room shall be controlled by a separate shut-off, located in the lobby, and controlled only in that particular place. Gas mains supplying any such room shall have independent connections for the auditorium and stage, and provision shall be made for shutting off the gas from the outside of the building. All suspended or bracket lights surrounded by glass, in the auditorium, or in any part of any such room, shall be provided with proper wire netting underneath. No gas or electric light shall be inserted in the walls, woodwork, ceilings, or in any part of any such room, unless protected by fireproof materials. The footlights, if gas light, in addition to the wire network, shall be protected by a strong wire guard, not less than two feet distant from such footlights, and the trough containing such footlights shall be formed of, and be surrounded by, fireproof materials. All border lights shall be constructed according to the best known methods, subject to the approval of the City Electrician, and shall be suspended by wire rope. All ducts and shafts used for conducting heated air from the main chandelier, or from any other light or lights, shall be constructed of metal, and made double, with an air space between. All stage lights, if gas, shall have strong metal wire guards or screens, not less than ten inches in diameter, so constructed that any material coming in contact therewith shall be out of reach of the flame, and such guards or screens shall be firmly soldered to the fixtures in all cases.

The use of calcium lights in any hall or room used regularly for theatrical or vaudeville performances is prohibited

and no calcium lights shall be permitted upon any stage, all are lights used on the stage shall be subject to the approval of the City Electrician.

Sec. 318a. It is hereby made the duty of all owners, occupants or lessees of theaters or places of amusement to provide separate dressing room or rooms for males and females in all theaters and places of amusement where dressing room or rooms are provided underneath, adjacent to or above the stage, or elsewhere in the building wherein said theater or place of amusement is located or maintained. The partitions forming said dressing room or rooms, except where already built, shall be constructed with incombustible material.

It shall be unlawful for any person, firm or corporation, whether owner, occupant or lessee of any theater or place of amusement, to permit the joint use by both males and females of any dressing room either underneath, adjacent to or above the stage, or elsewhere in the building wherein any theater or place of amusement is located or maintained.

Passed March 22, 1909.

Sec. 319. *Apparatus Under Control of Fire Marshal.*—The standpipes, hose, and all apparatus for the extinguishing of fire or guarding against the same, required by the provisions of this Chapter to be provided, shall be at all times so provided and kept in a manner satisfactory to the Fire Marshal.

Sec. 320. *Scenery to Be Incombustible.*—No scenery or stage paraphernalia of any sort shall be used upon the stage of any room used for the purposes of class IV, unless such scenery and paraphernalia shall have been treated with a paint or chemical solution which shall make in non-inflammable, and which treated scenery or stage paraphernalia, or both, shall be tested and approved by the Fire Marshal.

Two sets of such scenery may be used in existing buildings of this class having a seating capacity of less than 800, and the main floor of which is not more than three (3) feet above the street level of the street upon which such building opens.

Two sets of such scenery may also be allowed in existing buildings of this class having a seating capacity of over 800 and not over 1,200, and the main floor of which is not more than three feet above the street level of the street upon which such building opens; provided, that the main curtain opening in any such room shall have a wrought iron or steel curtain which shall be inspected by the Building Department semi-annually, for which inspection a charge of two dollars shall be made.

As amended by ordinance Feb. 10, 1908.

Sec. 321. *Commissioner of Buildings, City Electrician, Fire Marshal and Superintendent of Police Empowered to Enter.*—The Commissioner of Buildings, City Electrician, Fire Marshal, Superintendent of Police, and their respective assistants, shall have the right to enter any building used wholly or in part for the purposes of Class IV and any and all parts thereof, at any reasonable time, and at any time when occupied by the public, in order to examine such building, and it shall be unlawful for any person to interfere with them in the performance of their duties.

Sec. 322. *Power of Officers to Close.*—The Commissioner of Buildings, Fire Marshal, City Electrician or Superintendent of Police, or any one of them, shall have the power, and it shall be their joint and several duty, to order any building used wholly or in part for the purposes of Class IV closed, where it is discovered that there is any violation of any of the provisions of this article, until the same are complied with.

Sec. 323. *License—Mayor Shall Revoke.*—Upon the report to the Mayor by the Commissioner of Buildings, Fire Marshal, City Electrician, or Superintendent of Police, or any of them, that any order of requirement of this article in regard to buildings used wholly or in part for the purposes of Class IV has been violated or is not being complied with, in any such building, the Mayor shall revoke the amusement license of any amusement or entertainment therein conducted, and shall cause such building, or portion thereof, devoted to the uses of Class IV, to be closed.

ARTICLE VIII.

PROVISIONS RELATING SOLELY TO CLASS V.

BUILDINGS OF CLASS V NOW IN EXISTENCE.

In Class V shall be included every building which is used as a public theater where an admission fee is charged and in which movable scenery is used; provided, however, that public halls and club halls, with a seating capacity of less than six hundred, although occasionally used for theatrical representations, shall not be construed to be public theaters within the meaning of the term as used in this section, notwithstanding the fact that movable scenery is used upon the stage thereof on such occasions, and such public halls and club halls shall not be considered as buildings of Class V as herein defined. Such public halls and club halls shall be included in Class IV, as defined in Section 400 of this ordinance.

Sec. 324. The following provisions shall apply to buildings now in existence and used wholly or in part for the purposes of Class V.

Sec. 325. *Walls—Outside—Structures Built Above.*—The outside walls of all such buildings, the roofs or ceilings of which are carried on trusses or girders of a span of fifty feet or more, shall be as follows:

If such walls are less than twenty-five feet high, they shall be not less than twenty inches thick.

If they are more than twenty-five feet and less than forty-five feet high, they shall be not less than twenty-four inches thick.

If they are more than forty-five feet and less than sixty feet high, they shall be not less than twenty-eight inches thick.

If they are more than sixty feet and less than seventy-five feet high, they shall be not less than thirty-two inches thick.

If they are more than seventy-five feet and less than ninety feet high, they shall be not less than thirty-six inches thick.

An increase of four inches in thickness of such walls shall be made in all cases where they are over one hundred feet long, without cross-walls of equal height.

The thickness of the walls enclosing or surrounding rooms used for the purposes of Class V, where such rooms are less than fifty feet wide, may be reduced by four inches.

If one or more stories are built above any room devoted to the uses of Class V, and such stories are carried on trusses or girders, the thickness of walls shall be increased by four inches for each two stories or part thereof above such room.

If solid masonry buttresses are employed and placed eighteen feet or less apart, and extended to the foot of the trusses or girders carrying the ceiling, or if iron or steel columns are inserted in such walls for the support of the superstructure, and at a distance not more than twenty-four feet between centers, and if such columns extend to and carry the superimposed trusses and girders, the thickness of such walls may be reduced in proportion to the increase of strength

afforded by such buttresses or columns, but in no case shall any such wall be less than twelve inches thick in the top story, and four inches shall be added, going downward, for each story, for each gallery, or for each twenty-five feet in height of wall. Provided, that if in any such building now in existence the structural parts thereof do not comply with the foregoing requirements and structural changes are made therein, then all walls, columns or other structural parts shall be strengthened in a manner satisfactory to the Commissioner of Buildings.

Sec. 326. *Columns in Walls—Alterations.*—Amended by ordinance Dec. 2, 1907, to read as follows:

If iron or steel columns are introduced in such walls, the brick work around the same shall be bonded into that of the connecting walls, and each of such columns shall be fireproofed, as provided in Section 511 of this Chapter. All alterations in such existing buildings intended to make them comply with the requirements of this chapter may be executed with the same kind of materials as those originally used in the construction of such buildings; provided, that after the said building is brought into compliance with the provisions of this chapter, then, all subsequent alterations, enlargements, repairs, replaced or strengthened structural parts damaged by fire, wear and tear, or otherwise, shall be made of fireproof construction, iron or steel construction, covered with fireproof materials, as provided by Article XII of this chapter.

Sec. 327. *Other Classes Built in Conjunction with Class V—Doors for Openings Between Connecting Buildings.*—In all cases where existing buildings used wholly or in part for the purposes of Class V are built in conjunction with or as part of buildings devoted to the uses of other classes, and where such buildings of the other classes, as specified in this chapter, are not built entirely or fireproof construction, double iron doors shall be placed at each connecting opening between such buildings of Class V, and the building connected therewith.

Sec. 328. *Floor Levels—Limitations Of.*—The audience room or rooms or auditorium or auditoriums used for the purposes of Class V, containing in the aggregate not more than five hundred seats, if in a fireproof building, may be located in any story thereof, but in such case there shall be at least two separate stairways from the floor or floors in which such audience room or auditorium is located to the ground, each of which stairways shall be not less than four feet in width in the clear.

In existing buildings of fireproof construction, having an audience room or an auditorium with a seating capacity of more than five hundred and less than fifteen hundred, the lowest bank of seats of the main floor thereof shall be not more than twelve feet above the street level, and every such floor shall in all other respects conform to the requirements of this chapter. The main floor of no existing theater of any construction other than fireproof shall be raised above its present elevation.

Sec. 329. *Loads—Allowance for Live Loads in Construction of Floors of Class V.*—For all buildings of Class V, all floors shall be designed and constructed in such manner as to be capable of bearing in all their parts, in addition to the weight of floor construction, partitions and permanent fixtures and mechanisms that may be set upon the same, a live load of one hundred pounds for every square foot of surface in such floors.

Sec. 330. *Stairways—Entrance and Exits.*—Stairways affording ingress to or egress from any room or rooms used for the purposes of Class V shall be in width equivalent to

twenty inches for every one hundred of seating capacity of such room and for fractional parts of one hundred a proportionate part of twenty inches of width shall be added, but in no event shall any such stairway be less than four feet wide in the clear, except as hereinafter provided in this section.

All such stairways shall have hand railings on each side thereof and shall not ascend a greater height than thirteen feet six inches without a level landing, and the length and width of such landing shall not be less than the width of the stairs; no run of stairs shall consist of less than six risers between platforms, and risers shall not be placed on return platforms. Stairways which are over 7 feet wide shall have double intermediate handrails, with end newel posts at least 5½ feet high.

Steps shall not have a greater rise than seven and three-eighths inches, treads shall not be narrower than eleven inches, and winders shall not be used on any staircase, except where circular staircases are expressly permitted.

In existing theaters each and every balcony and gallery shall have separate and distinct entrance stairways from the sidewalk level, except that in cases where the vestibule or entrance to any such theater is not more than fifteen inches, or two steps, above the sidewalk level and such steps are at or near the building line, the stairways to such balcony and gallery may ascend from the floor of such vestibule or entrance, but if the run of the stairs at the bottom is not toward the street, there shall be a hand rail or rails three feet above the floor, constructed from the foot of such stairways for a distance of not less than five feet leading toward the street. All doors intervening between such stairways and the street shall, during each and every performance, be kept unfastened.

There shall be an iron stairway or stairways from the stage to the fly galleries and gridiron, continuing to the roof of the building or to some fireproof passageway or exit. Such stairways may be circular. Such circular stairways, however, shall not be used for access to the dressing rooms.

Stairs leading to a box or boxes seating not to exceed thirty people, in the aggregate, shall be independent of all other stairs and seats and not less than two feet eight inches wide in the clear. For each additional twenty-five of seating capacity, or major portion thereof, there shall be an additional width of five inches added to such stairways.

All stairways on the stage side of the proscenium wall shall be not less than two feet six inches wide.

Instead of increasing the width required for entrances, aisles, exits and stairways to that required by this chapter, the owner, lessee or manager of any such theater shall have the privilege of reducing the number of permanent seats therein until the same ratio between such width and number of seats as hereinbefore provided for shall be established, and if such privilege be taken advantage of, it shall be the duty of the Commissioner of Buildings to make inspection and certify that such ratio actually exists before a license for the operation of any such theater shall be issued.

Sec. 331. *Floors at Exits.*—Floors at all exits shall be so designed as to be level and flush with adjacent floors and shall extend for an unbroken width of not less than four feet in front of each exit, and shall be two feet wider than such exit.

Sec. 332. *Seats in Rows Between Aisles.*—More than ten seats in any row between aisles in any gallery shall not be permitted. On the main floor and balcony, not more than eleven seats between aisles shall be permitted; provided, how-

ever, that in banks of seats no main floors and balconies that are not at a greater distance than twenty feet from an exit, thirteen seats shall be permitted between aisles.

Seats shall be not less than twenty inches in width, measured at the top of the seat backs.

Rows of seats shall be not less than two feet eight inches from back to back.

No bank of seats shall be of greater rise than twenty two inches.

All groups of seats shall be so arranged that there shall be an aisle at each side of each group, provided, however, that groups of five seats or less may abut upon a tunnel at one side and an aisle at the other side.

The number of banks of seats on the main floor shall not exceed fifteen, unless an intervening or cross aisle is provided between each fifteen banks of seats or a direct exit is provided for each aisle.

The number of banks of seats in the balcony shall not exceed nine unless an intervening or cross aisle is provided between each nine banks of seats or a direct exit is provided for each aisle.

Sec. 333. *Tunnels—Cross Aisles—Vertical Rise—Foyer.*—There shall be no more than twelve feet rise, measured vertically, in any aisle in any gallery without a direct exit by tunnel or otherwise to a corridor with free opening on to the gallery stairs or other direct discharge to the street, or at such elevation of twelve feet an intervening or cross aisle leading directly to an exit. No tunnel shall be less than three feet wide in the clear. No foyer shall be open to the theater proper except through the exits.

Sec. 334. *Main Floor—Balcony and Gallery—Designation Of.*—The lower floor of all theaters shall be designated the "Main Floor."

Where there are balconies or galleries, the first balcony or gallery shall be designated the "Balcony" and the second and third balcony or gallery shall be designated, respectively, "Gallery" and "Second Gallery." Such designation shall be printed plainly on all admission tickets.

Sec. 335. *Aisles, Corridors and Passageways—Kept Unobstructed—Steps in Aisles.*—The minimum width of aisles with diverging sides in any room or auditorium used for the purposes of Class V shall be two feet eight inches at the end near the stage and not less than three feet at the other end.

The minimum width of aisles with parallel sides shall be three feet.

Every aisle shall lead as nearly as possible directly to an exit, but in no case shall the center line of such exit be more than three feet from the center line of any such aisle leading thereto. Steps shall not be permitted in aisles except as extending from bank to bank of seats and no riser shall be greater than seven and three-eighths inches, and no tread shall be less than nine and one-half inches, and whenever the rise from bank to bank of seats is less than five inches, the floor of the aisles shall be made as an inclined plane, and where steps are placed in outside aisles or corridors they shall not be isolated, but shall be grouped together and a light shall be maintained so that every place where there are steps in inclosing aisles or corridors shall be clearly lighted. All aisles, passageways, corridors and exits shall be kept free from camp stools, chairs, sofas and other obstructions, and no person shall be allowed to stand in or occupy any such aisles, passageways, corridors or exits during any performance, service, exhibition, lecture, concert or any public assemblage.

Sec. 336. *Corridors, Passageways, Hallways and Doors—Width Of.*—The width of corridors, passageways, hallways and doors shall be computed in the same manner as that hereinbefore provided for stairways, excepting, however, that no corridor shall be anywhere less than four feet in width, and no door less than three feet wide, except as otherwise herein provided.

All corridors, passageways, hallways and stairways leading from any balcony or gallery to any toilet room, retiring room, smoking room, check room or private office, shall permit of free passage, without returning to an outer exit of the building. Such corridors, passageways, hallways and stairways shall be at least three feet in width in every part between such balcony or gallery and such outer exit, and shall be unobstructed in every part except by doors, not less than three feet in width in the clear, which shall swing outward and which shall not be provided with locks or catches of any kind whatever.

Sec. 337. *Doors—Entrance.*—The entrance doors to every theater shall be of sufficient width to accommodate the entire audience, computed on the basis of twenty inches in width in the clear to each hundred permanent seats, and in addition thereto a proportionate part of twenty inches for a fractional part of each one hundred seats in the audience room or auditorium.

No mirrors shall be so arranged as to give the appearance of a doorway, exit, hallway or corridor, when no such doorway, exit, hallway or corridor is really in existence, nor shall there be any false doors or windows giving the appearance of an opening where none really exists.

Walls—Ledges.—See Section 588.

Doors and Windows—When Required to be Closed—Fire-resisting Glass.—See Section 632.

Sec. 338. *Emergency Exits—Width—Emergency Stairs—Width—Emergency Exits Inside Walls of Buildings—Fire Escapes, Construction—Fire Escapes Leading to Street or Alley—Doors Open Outward.*—Emergency exits and stairways shall be provided separately for each floor, balcony and gallery. They shall be of the same aggregate width as that provided for the main exits, and no emergency exit, doorway or stairway shall be less than three feet in width. Such emergency stairways shall be made of iron, steel or other incombustible materials. Such emergency exits shall be kept free of obstructions of any kind, including snow and ice.

Such emergency exits and stairways may be built inside the walls of the building, provided they are surrounded by a fireproof partition not less than four inches thick separating the exits and stairways from the audience room or auditorium.

If said emergency exits lead outside the building, the opening leading thereto shall have metal frames filled with wire glass doors opening outward, hung from the inside corner of the jambs, and so constructed as not to project, when opened, beyond the outside face of the wall. Outside shutters will not be permitted, except when the same shall open automatically from the interior, without resistance, and when used or opened will automatically fasten, securely, flat against the wall, so as not to in any way obstruct the passage on the outside; all such automatic devices or attachments to said doors to be subject to the approval of the Commissioner of Buildings and the Fire Marshal of the City of Chicago.

As amended Oct. 22, 1906.

Whenever any such emergency stairway passes over an exit door or window or other opening, such stairway shall be completely inclosed for a space of five feet greater in width

than such opening by iron, steel or other incombustible material.

All such emergency exits and stairways shall land at the ground level in a public thoroughfare or in some space that connects directly with a street or alley and direct and immediate exit to such public thoroughfare shall not be obstructed by any doors, gates, bars or other obstruction of any character.

Every court in which there is an emergency stairway shall have direct and unobstructed access along the surface of the ground to a street, alley or yard opening into an alley or street, without entering into or passing through or over any building unless by a four-foot wide fireproof passage on the court or ground level.

All doors in openings from any and all exits and stairways shall be so constructed that when opened they shall not obstruct any portion of any other doorway, opening or passageway.

All doors affording ingress to or egress from any theater shall open outward upon suitable hinges.

Sec. 339. *Exit Doors—Particulars as To.*—Exit doors shall not be obscured by draperies and shall not be locked or fastened in any manner during the entire time such theater is open to the public, so as to prevent them from being easily opened outwardly; and such door shall be so constructed and maintained as to require no special knowledge or effort to open them from the interior.

Sec. 340. *Wall—Brick Proscenium Wall Between Auditorium and Stage—Steel Curtain Fireproofed on Stage Side—No Combustible Material on Audience Side—Plans for Curtain—Permit from Building Department—Inspection—Fee.*—There shall be in every theater a solid brick wall of the same construction and thickness as is required in outside walls between the auditorium and the stage. The main proscenium opening shall have a substantial steel curtain vertically operated and fireproofed on the stage side, which shall be raised and lowered by mechanical power and which shall be in constant use as the regular curtain and act drop.

No combustible material other than painted decorations shall be applied to the audience side of such curtains.

Plans for such curtain shall be approved by the building department and a permit obtained for its erection. The building department shall inspect such curtain semi-annually, for which inspection a fee of two (\$2) dollars shall be charged.

All other openings in such proscenium wall shall have iron doors, frames and thresholds.

Sec. 341. *Stage, Construction Of—Fireproof Paint—Scenery—How Treated.*—The framing of the floor of every stage shall be of iron or steel. The stage floor may be of wood, but shall not be less than two and three-fourths inches thick. The entire floor construction and floor of fly galleries, rigging lofts and paint gallery, all railings and supports and stanchions thereon, and all sheaves, pulleys and cables and their supports shall be of iron or steel. All woodwork, including the under side of floor boards, and all framing for scenery used on or about the stage shall be coated with a fireproof paint, the qualities of which shall be submitted to and approved by the Commissioner of Buildings. All wood used for floor and floor supports shall be coated on the under side with the same kind of paint.

No scenery or stage paraphernalia of any sort shall be used upon the stage of any room used for the purposes of Class V, unless such scenery and paraphernalia shall have been treated with a paint or chemical solution which shall make it non-

inflammable, and which treated scenery or stage paraphernalia, or both, shall be tested and approved by the Fire Marshal.

Sec. 342. *Vestibule of Stage Doors.*—All doorways or openings in the rear or sides of the stage shall be vestibuled or protected in a manner satisfactory to the Commissioner of Buildings, so as to protect the curtain, scenery and auditorium against draughts of air.

Sec. 343. *Vents, Flue Pipes, Size Of—Dampers—Stitches for Dampers.*—One or more vents or flue pipes, of metal construction, or other incombustible material suitable for carrying away smoke, approved by the Commissioner of Buildings, and extending not less than fifteen feet above the highest point of the roof, and equivalent in area to one-twentieth of the area of the stage, shall be built over the stage.

In buildings where additional stories are built above the stage, such vents or flue pipes may be carried out near the top of the stage walls and shall be continued and run up on the exterior of the building to a point five feet above the highest point of such additional stories.

All such flues or vents shall be provided with metal dampers, and shall be opened by a closed circuit battery approved by the city electrician; such dampers shall be controlled by two switches, one at the electrician's station on the stage, which station shall be fireproof, and the other at the city fireman's station on the opposite side of the stage; such switches shall be located at such places on the stage as are designated by the fire marshal, and each shall have a sign with plain directions as to the operation of same printed thereon.

All fuse boxes shall be surrounded by two thicknesses of fireproof material, with an air space between, and no fuses shall be exposed to the air between the switchboards.

Sec. 344. *Automatic Sprinklers—Location Of—Tank—Connections.*—There shall be provided an approved system of automatic sprinklers, with approved automatic closed circuit electric devices connecting the valves regulating the flow of water in the various sprinkler pipes, with the headquarters of the city fire alarm telegraph and such other place or places as the Fire Marshal shall direct, so arranged as to prevent any tampering with the system or the shutting off of the water from the sprinkler pipes without automatic notice to the fire department.

Such system of automatic sprinklers shall be supplied with water from a tank located not less than twenty feet above the level of the highest sprinkler head in the system, and it shall be the duty of the fireman provided for in this chapter to include in his daily report the result of an inspection to determine the sufficiency of water in this tank. Automatic sprinklers shall be placed in the paint room, store-room, property room, scene storage room, carpenter shop and dressing rooms, if such rooms are in or connected with a building used for the purposes of Class V, such tank shall not be connected with a standpipe and ladder system, but shall be filled through a separate pipe from a fire pump, and a three-inch iron pipe shall extend from such tank to the outside of such building, with Siamese connections for fire department use. Such entire automatic sprinkler system and equipment and the location thereof shall be subject to the approval of the Fire Marshal.

Sec. 345. *Fire Apparatus on Stage—Hand Fire Pumps—Fire Materials—Hot Air Furnaces.*—A standpipe not less than two and one-half inches in diameter, having a hose valve or valves thereon, shall be installed on each side of the stage,

with a hose connection at the stage and at each level above and below the stage, and hose connected thereto at each valve ready for use at all times. Such standpipe shall be connected with a tank on the roof containing not less than three thousand gallons of water, protected from frost, and also with a power pump, all of which shall be subject to the approval of the Fire Marshal. Portable fire extinguishers or hand fire pumps shall always be kept ready for use on and under the stage; in fly galleries and in rigging lofts, and in additions thereto at least four fire department axes and six pike poles shall be kept ready for use on each tier or floor of the stage, all of which shall be subject to the approval of the Fire Marshal.

The use of ordinary hot air furnaces or stoves is prohibited.

Sec. 346. *Exits—Diagram Of, Printed on Program.*—It shall be the duty of the owner, lessee or manager of any theater, for any performance in which programs are issued, to cause to be printed on such programs, on the page opposite that upon which the cast is printed, a diagram showing conspicuously all exits of such building. A diagram of seats of each floor, and the exits leading from each floor drawn to a scale of one-eighth inch to the foot, shall be hung in a frame within two feet of the ticket seller's window and so as to be easily seen by the public.

Sec. 347. *Lighting—Independent Lighting System for Exits—Red Light Over Exits.*—All stairways and corridors shall be supplied with a supplementary lighting system of electricity, gas or sperm oil, and such system shall be independent of all other lights in such building and shall be in operation during the entire period such theater is open to the public and until the audience has left the building. The word "EXIT" shall be in letters at least six inches high over the opening to every means of egress from such theater and a red light furnished by gas or sperm oil shall be kept burning over such word "EXIT" at every such opening, during the entire period such theater is open to the public and until the audience has left the building.

Sec. 348. *Fire Alarm Apparatus.*—Every theater shall be provided with an approved system of automatic or manual fire alarm telegraph apparatus, connected by the necessary wires with the headquarters of the city fire alarm telegraph, and such other place or places as the Fire Marshal may direct. The number and location of the boxes and the character of the system, whether automatic or manual, or both, shall be determined by the Fire Marshal.

Sec. 349. *Firemen—Employment Of—Duties.*—Amended by ordinance, June 8, 1908, to read as follows:

It shall be the duty of every person, firm or corporation conducting, operating or maintaining a theater to procure at his, their or its own expense, the attendance, at each and every performance, of one fireman who shall be detailed by the Fire Marshal from the regular City Fire Department; he shall be in the uniform of the Chicago Fire Department and he shall be on duty at such theater during the entire time it is open to the public. He shall report to and be subject to the orders of the Fire Marshal and shall see that all fire apparatus required by this Chapter is in its proper condition, ready for use and that all exit doors are unlocked during the entire time such theater is open to the public and are all in efficient and ready working order. During the performance he shall remain on the stage and shall generally perform such duties as may be required of him by the rules and regulations of the Fire Department governing firemen detailed at theaters.

It shall also be the duty of every person, firm or corporation conducting, operating or maintaining a theater to employ in addition to the fireman hereinbefore provided for, one other experienced and competent person as a private watchman or fireman who shall be approved by the Fire Marshal and who shall be in distinctive uniform and shall be on duty at such theater during the entire time it is open to the public. Such private watchman or fireman shall report and be subject to the orders of the Fire Marshal and it shall be his duty to see that the provisions of this Chapter are complied with in all portions of the theater occupied and used by the public, and that all exit doors are unlocked during the entire time such theater is open to the public, and in efficient and ready working order. The city fireman and Fire Marshal shall require a drill of the employees of such theater, including such private watchman or fireman, in the use of all apparatus and appliances for the prevention of fire inside the building and the saving of life, at least twice in every week, and such city fireman shall report to the Fire Marshal the manner and efficiency of such drill. Such city fireman shall report in writing daily to the Fire Marshal the condition and equipment of the theater to which he is detailed. No city fireman shall be on duty at any one theater for a longer period than two weeks.

The compensation to be paid the city for the services of such city fireman so detailed shall be based on the regular salary paid by the city to such fireman, and shall be computed according to the ratio between the number of hours such fireman is required by his duties hereunder to devote to such theater and the total number of hours such fireman is employed by the city for all purposes. All sums received by the city under the provisions of this section shall be for the use and benefit of the Fire Department.

Sec. 350. *Amusement License.*—The amusement license issued for each theater shall state the number of permanent seats the theater contains, which number shall be governed by the provisions of this ordinance relating thereto, and no more than that number of persons shall be permitted to be in such theater at any one time.

No license for the operation of a theater will be issued unless the Commissioner of Buildings, Fire Marshal and the City Electrician shall first have certified, in writing, that such theater complies with the provisions of this chapter in every respect.

Sec. 351. *Lighting—All Parts Well Lighted During Performances.*—Every portion of any theater devoted to the use or accommodation of the public and all outlets therefrom leading to the streets, including all open courts, corridors, stairways, exits and emergency exit stairways, shall be well and properly lighted during every performance, and the same shall remain lighted until the entire audience has left the premises.

Sec. 352. *Lights—Control of Lights in Halls, Corridors and Lobbies—Separate Shut-off—Connections with Gas Mains—Independent Connections—Protection of Suspended and Bracket Lights—Protection of Lights Inserted in Walls—Protection of Footlights—Construction of Border Lights—Ducts and Shafts Conducting Heated Air from Lights—Gas Stage Lights to Have Metal Screens.*—All gas or electric lights in the halls, corridors, lobbies or any part of any theater used by the audience, except the auditorium, shall be controlled by a separate shut-off, located in the lobby, and controlled only in that particular place. Gas mains supplying such theater shall have independent connections for the audi-

torium and the stage, and provision shall be made for shutting off the gas from the outside of the building. All suspended or bracket lights surrounded by glass in the auditorium, or in any other part of the theater, shall be provided with proper wire netting underneath. No gas or electric lights shall be inserted in the walls, woodwork, ceilings, or in any part of the theater, unless protected by fireproof materials. In case gas is used the footlights, in addition to the wire network, shall be protected by a strong wire guard not less than two feet distant from such footlights, and the trough containing such footlights shall be formed of and surrounded by fireproof material. All border lights shall be constructed according to the best known method, and subject to the approval of the Fire Marshal and the City Electrician, and shall be suspended by wire rope. All ducts and shafts used for conducting heated air from the main chandelier, or from any other light or lights, shall be constructed of metal and made double, with an air space between. All gas stage lights shall have strong metal wire guards or screens not less than ten inches in diameter, so constructed that any material coming in contact therewith shall be out of reach of the flames of such lights, and such guards or screens shall be soldered to the fixtures in all cases.

The use of calcium lights in any theater is prohibited. All arc lights used on the stage shall at all times be subject to the approval of the city electrician, and no arc lights shall be used on any stage unless approved by said city electrician.

Sec. 353. *Fire Apparatus—Under Control of Fire Department.*—The standpipes, automatic sprinklers, gas pipes, electric wires, hose, footlights, fire alarm boxes, fireproof proscenium curtain, switch boxes, ventilators, controlling levers, axes and pike poles, and all apparatus for the extinguishing of fire or guarding against the same, as provided for by this chapter, shall be made and kept at all times in condition satisfactory to and under the control of the Fire Marshal.

Sec. 354. *Officers Empowered to Enter Buildings.*—The Commissioner of Buildings, Fire Marshal, City Electrician, Superintendent of Police, or any of them, and their respective assistants, shall have the right to enter any building used wholly or in part for the purposes of Class V, and any and all parts thereof, at any reasonable time, and at any time when occupied by the public, in order to examine such buildings; to judge of the condition of the same and to discharge their respective duties, and it shall be unlawful for any person to interfere with them, or any of them, in the performance of their duties.

Sec. 355. *The Commissioner of Buildings, Fire Marshal, City Electrician or Superintendent of Police Shall Close Buildings for Violations.*—The Commissioner of Buildings, Fire Marshal, City Electrician and the Superintendent of Police, or any one of them, shall have the power and it shall be their joint and several duty, to order any building used wholly or in part for the purposes of Class V, closed, where it is discovered that there is any violation of any of the provisions of this chapter and keep same closed until such provisions are complied with.

Sec. 356. *License—Mayor Shall Revoke.*—Upon a report to the Mayor by the Commissioner of Buildings, Fire Marshal, City Electrician or the Superintendent of Police that any requirement of this chapter, or that any order given by them or any of them in regard thereto has been violated, or not complied with, the Mayor shall revoke the license of any such theater or place of amusement so reported and cause the same to be closed.

BUILDINGS OF CLASS V HEREAFTER ERECTED.

Sec. 357. The following provisions shall apply to buildings hereafter erected and used wholly or in part for the purposes of Class V.

Sec. 358. *Walls—Outside Walls—Structures Built Above.*—The outside walls of all such buildings, the roofs or ceilings of which are carried on trusses or girders of a span of fifty feet or more, shall be as follows:

If such walls are less than twenty-five feet high they shall not be less than twenty inches thick.

If they are more than twenty-five feet and less than forty-five feet high they shall be not less than twenty-four inches thick.

If they are more than forty-five feet and less than sixty feet high they shall be not less than twenty-eight inches thick.

If they are more than sixty feet and less than seventy-five feet high they shall be not less than thirty-two inches thick.

If they are more than seventy-five feet and less than ninety feet high, they shall be not less than thirty-six inches thick.

An increase of four inches in thickness of such walls shall be made in all cases where they are over one hundred feet long without cross walls of equal height.

The thickness of the enclosing or surrounding walls of rooms used for the purposes of Class V, where such rooms are less than fifty feet wide, may be reduced by four inches.

If one or more stories are built above any room devoted to the use of Class V, and such stories are carried on trusses or girders, the thickness of walls shall be increased by four inches for each two stories or part thereof above such room.

If solid masonry buttresses are employed and placed eighteen feet or less apart, and extended to the foot of the trusses or girders carrying the ceiling, or if iron or steel columns are inserted in such walls for the support of the superstructure, and at distances not more than twenty-four feet between centers, and if such columns extend to and carry the superimposed trusses or girders, the thickness of such walls may be reduced in proportion to the increase of strength afforded by such buttresses or columns, but in no case shall any such wall be less than twelve inches thick in the top story, and four inches shall be added, going downward, for each story, for each gallery, or for each twenty-five feet in height of wall.

Sec. 359. *Columns in Walls.*—If iron or steel columns are introduced in such walls, the brickwork around such columns shall be bounded into the brickwork of the connecting wall, and each of such columns shall be fireproofed, as provided in Section 511 of this chapter.

Walls Around Stairs, Elevators and Shafts.—See Section 588.

Sec. 360. *Construction—Frontage—Open Spaces and Enclosed Passages.*—All buildings hereafter erected and used wholly or in part for the purposes of Class V shall be built entirely of fireproof construction and shall be located so that they adjoin at least two public thoroughfares, one of which shall be a public street, and the other may be a public alley not less than ten (10) feet in width.

All floors, balconies and galleries of the audience room of every theater shall have open spaces or fireproof passageways on the three sides other than the proscenium; and on each of the two opposite sides other than the back and proscenium of every stage there shall be open spaces or fireproof passageways, and such open spaces or fireproof passageways shall open on or connect directly with the public thoroughfares.

All open spaces shall not be less than ten (10) feet in width and all fireproof passageways shall not be less than eight (8) feet in width, and shall be outside of the audience room, and shall be kept and maintained free and clear of obstructions of any and all kinds at any and all times.

Provided, however, that where said theater does not seat more than five hundred persons on the main floor, the width of such fireproof passageway on each side of the auditorium on the main floor may be reduced to five feet for that portion of passageway immediately adjoining the auditorium.

The width of such passageways shall be increased twelve (12) inches for each 100 additional seating capacity or fraction thereof of such main floor, until the maximum now required by law, namely, eight (8) feet, is reached, but no such passageway shall be less than five (5) feet in width in this class.

As amended Nov. 25, 1907.

All open spaces shall be open and unobstructed from the floor or pavement of such space to the sky, with the exception that emergency stairs and emergency balconies may be built in such open spaces. The entire floor of every open space shall be level or inclined; the incline shall not exceed two (2) inches in height for each one foot of horizontal measurement.

If one or more fireproof passageways are required on one side of the stage, then the fireproof passageways of each floor and the balcony and each gallery of the audience room shall be continued through the stage house as fireproof passageways to an open space or public thoroughfare, and from the end of each such fireproof passageway there shall be doors or stairs, or both, which shall be arranged so as to afford a safe exit for the audience of such theater to the pavement of the public thoroughfares, and if fireproof passageways are required on both sides of the stage, then they shall be arranged and connected with all of the fireproof passageways on both sides of the audience room in the same manner as described for fireproof passageways when these are required only on one side of the stage.

The fireproof passageways for the main floor may pass under the stage floor.

Provided, however, that where there is no public thoroughfare or open space at the back of the stage and on one side of the stage, then the fireproof passageways for the main floor shall be on the stage floor and shall be built along that side of the stage on which there is no public thoroughfare and across the back of the stage to one of the public thoroughfares, and the fireproof passageways for the balcony and the fireproof passageways for the galleries shall each be built along the side of the stage and across the back of the stage, in a continuation of the balcony and gallery floor level to a public thoroughfare.

The fireproof passageways of the different floors, of the balcony and of the galleries, shall be independent of each other and shall not be connected with each other in any manner.

No doors or other openings except entrance doors from the audience room or exit doors to a thoroughfare shall be in the walls of a fireproof passageway; and all such doors shall be so arranged that when open they shall not obstruct the passage.

The walls of a fireproof passageway shall be not less than four (4) inches thick, and each and every part of such passageway, including each and all of its supports, shall be built of fireproof construction as required in the general provisions relating to fireproof construction of this chapter.

Radiators for warming passageways shall be in recesses.

There shall be no steps or risers in a fireproof passageway, but where necessary inclined floors of the full width of the fireproof passageways may be built; the incline of the floor shall not exceed two and one-half ($2\frac{1}{2}$) inches in height per foot, measured horizontally, and no such incline shall be less than ten (10) feet in length. No fireproof passageway shall be less than eight (8) feet high in any part thereof, except at doors, and these shall not be less than seven (7) feet high.

If the principal entrance corridor of a theater is at one side of the audience room, then the center line extended of such principal entrance shall intersect the center axis of the stage and the audience room between the back of the seat most remote from the stage on said center axis of the stage and the audience room, and a point midway between such seat and the wall opposite the proscenium wall.

Sec. 361. *Buildings of Other Classes Built in Conjunction With Class I—Construction Of.*—If buildings used wholly or in part for purposes of Class V are built in conjunction with or as part of buildings devoted to the uses of other classes, then such buildings of other classes shall be built entirely of fireproof construction.

Sec. 362. *Floor Levels—Limitation Of.*—In all cases where the floors of the auditorium of any theater in any such building of Class V are banked or stepped up, the floor level of the lowest bank shall not be above the sidewalk level.

All floors shall be designed and constructed in such manner as to be capable of bearing in all their parts, in addition to the weight of floor construction, permanent fixtures and mechanisms that may be set upon the same, a live load of one hundred pounds for every square foot of surface in such floors.

The audience room or rooms or auditorium or auditoriums used for the purposes of Class V containing, in the aggregate, not more than five hundred seats, if in a fireproof building, may be located in any story thereof, but in such case there shall be at least two separate stairways from the floor or floors in which such audience room or auditorium is located to the ground, each of which stairways shall be not less than four feet in width in the clear.

Sec. 363. *Stairways—Entrances and Exits.*—Stairways affording ingress to or egress from any room used for the purposes of Class V shall be in width equivalent to twenty inches for every one hundred of seating capacity of such room, and for fractional parts of one hundred a proportionate part of twenty inches of width shall be added, but in no event shall any such stairway be less than four feet wide in the clear, except as hereinafter provided.

All such stairways shall have hand railings on each side thereof, and shall not ascend a greater height than thirteen feet six inches without a level landing, and the length and width of such landing shall be not less than the width of the stairs; no run of stairs shall consist of less than six risers between platforms, and risers shall not be placed on return platforms. Stairways which are over seven feet wide shall have double intermediate handrails with end newel posts at least five and a half feet high.

Steps shall not have a greater rise than seven and three-eighths inches, treads shall be not narrower than eleven inches, and winders shall not be used on any staircase.

Each and every balcony and gallery shall have separate and distinct entrances and stairways from the sidewalk level. The bottom run of the stairs shall be directly toward the street. Such stairs may ascend from the vestibule or entrance inside of the building, but the bottom riser of such stairs shall be not more than sixty-five feet from the building line. All

doors between such stairs and the street shall be kept unlocked and unfastened during each and every performance and until the audience has left the building.

There shall be an iron stairway or stairways from the stage to the fly gallery and gridiron, continuing to the roof of the building or to some fireproof passageway or exit. Such stairways may be circular. Such circular stairways, however, shall not be used for access to the dressing rooms.

Stairs leading to a box or boxes seating not to exceed thirty people in the aggregate shall be independent of all other stairs and seats, and not less than two feet eight inches wide in the clear. For each additional twenty-five of seating capacity or major portion thereof in such box or boxes there shall be an additional five inches in width of such stairway.

All stairways on the stage side of the proscenium wall shall be not less than two feet six inches wide.

Sec. 364. *Floors at Exits—Seating.*—Floors at all exits shall be so designed as to be level and flush with adjacent floors and shall extend for an unbroken width of not less than four feet in front of each exit, and shall be two feet wider than such exit.

More than ten seats in any one row between aisles shall not be lawful.

Seats shall be not less than twenty-two inches in width, measured at the top of the seat backs.

Rows of seats shall not be less than two feet ten inches from back to back.

No bank of seats shall have a greater rise than twenty-two inches.

All groups of seats shall be so arranged that there shall be an aisle at each side of each group, provided groups of five seats or less may abut upon a tunnel at one side and an aisle at the other side.

The number of banks of seats on the main floor shall not exceed fifteen, unless an intervening or cross aisle is provided between each fifteen banks of seats or a direct exit is provided for each aisle. The number of banks of seats in the "balcony" shall not exceed nine, unless an intervening or cross aisle is provided between each nine banks of seats or a direct exit is provided for each aisle.

Sec. 365. *Tunnels—Cross Aisles—Vertical Rise—Foyer.*—There shall be no more than eleven feet rise, measured vertically, in any aisle in any gallery without a direct exit by tunnel or otherwise, to a corridor with free opening on to the gallery stairs or other direct discharge to the street, or at any such elevation of eleven feet an intervening or cross aisle leading directly to an exit. No tunnel shall be less than three feet wide in the clear.

No foyer shall be open to the theater proper except through the exits.

Sec. 366. *Main Floor—Balcony and Gallery—Designation Of.*—The lower floor shall be designated the "Main floor."

Where there are balconies or galleries the first balcony or gallery shall be designated the "Balcony," and the second and third balcony or gallery shall be designated, respectively, "Gallery" and "Second Gallery." Such designation shall be printed plainly on all admission tickets.

Sec. 367. *Aisles and Passageways—Kept Unobstructed—Steps in Aisles.*—The minimum width of aisles with diverging sides in any room or auditorium used for the purposes of Class V shall be two feet eight inches at the end near the stage, and not less than three feet at the other end.

The minimum width of aisles with parallel sides shall be three feet.

Every aisle shall lead directly to an exit. Steps shall not be permitted in aisles except as extending from bank to bank of seats, and no riser shall be more than seven and three-eighths inches in height, and no tread shall be less than ten inches in width, and whenever the rise from bank to bank of seats is less than five inches, the floor of the aisles shall be made as an inclined plane; and where steps are placed in outside aisles or corridors they shall not be isolated, but shall be grouped together, and a light shall be maintained so that every place where there are steps in enclosing aisles or corridors shall be clearly lighted. All aisles, passageways, corridors and exits shall be kept free from camp stools, chairs, sofas and other obstructions, and no person shall be allowed to stand in or occupy any such aisles, passageways, corridors or exits during any performance, service, exhibition, lecture, concert or at any public assemblage.

Sec. 368. *Corridors—Passageways—Hallways and Doors—Width of Entrance Doors.*—The width of corridors, passageways, hallways and doors shall be computed in the same manner as that hereinbefore provided for stairways, excepting, however, that no corridors shall be anywhere less than four feet in width and no doorway less than three feet wide, except as otherwise herein provided.

All corridors, passageways, hallways and stairways leading from any balcony or gallery to any toilet room, retiring room, smoking room, cloak room, check room or private office shall permit of free passage, without returning, to an outer exit of the building. Such corridors, passageways, hallways and stairways shall be at least three feet in width in every part between such balcony or gallery and such outer exit, and shall be unobstructed in every part, except by doors not less than three feet in width in the clear, which shall swing outward and which shall not be provided with locks or catches of any kind whatever.

The entrance doors to every theater shall be of sufficient width to accommodate the entire audience, computed on the basis of twenty inches of width in the clear to each one hundred permanent seats or proportionate part thereof in the audience room or auditorium of such theater, and all doors shall be so arranged that when open they shall not obstruct any corridor or passage whatsoever into which they open.

No mirrors shall be so arranged as to give the appearance of a doorway, exit, hallway or corridor, when no such doorway, exit, hallway or corridor is really in existence, nor shall there be any false doors or windows giving the appearance of an opening where none really exists.

Sec. 369. *Emergency Exits, Width—Emergency Stairs, Width—Emergency Exits Inside Walls of Buildings—Fire Escapes Construction—Fire Escapes Leading to Street or Alley—Doors Open Outward.*—Emergency exits and stairways shall be provided separately for each floor, balcony or gallery. They shall be of the same size as that provided for the main exits, and no emergency exit, doorway or stairway shall be less than three feet in width. Such emergency stairway shall be made of iron, steel or other incombustible material. Such emergency exit shall be kept free of obstructions of any kind, including snow and ice.

Such emergency exits and stairways may be built inside the walls of the building, provided they are surrounded by a fire-proof partition not less than four inches thick, separating the exits and stairways from the audience room or auditorium.

If such emergency exits lead outside the building, the openings leading thereto shall have metal door frames and metal doors with panels filled with fire-resisting glass, opening out-

ward, hung from the inside corner of the jambs, and so constructed as not to project when opened beyond the outside face of the wall, and outer shutters shall not be permitted.

Whenever any such emergency stairway passes over an exit or door or window or other opening, such stairway shall be completely enclosed for a space of five feet greater in width than such opening, by iron, steel or other incombustible material.

All such emergency exits and stairways shall land at the ground level in a public thoroughfare or in some space that connects directly with a street or alley, and direct and immediate exit to such public thoroughfare shall not be obstructed by any door, gate, bars or other obstruction of any character.

Every court in which there is an emergency stairway shall have direct and unobstructed access along the surface of the ground to a street, alley or yard opening into an alley or street without entering into or passing through or over any building unless by a four-foot wide fireproof passage on the court or ground level.

All doors in openings from emergency exits and stairways shall be so constructed that when opened they will not obstruct any portion of any other doorway, opening or passageway.

All doors affording ingress to or egress from any theater shall open outward upon suitable hinges.

Exit doors shall not be obscured by draperies and shall not be locked or fastened in any manner during the entire time such theater is open to the public, so as to prevent them from being easily opened outwardly; and such doors shall be so constructed and maintained as to require no special knowledge or effort to open them from the interior.

Sec. 370. *Wall—Brick—Proscenium Between Auditorium and Stage—Steel Curtain Fireproofed on Stage Side—No Combustible Material on Audience Side—Plans for Curtain—Permit from Building Department—Inspection Fee.*—There shall be a solid brick wall of the same construction and thickness as is required in the outside walls of the building in which such theater is located, between the auditorium and the stage.

The main proscenium opening shall have a vertically operated steel curtain which shall, when it is lowered, completely close such proscenium opening. The curtain shall be raised and lowered by mechanical power, other than hand power, as the regular curtain and act drop each and every time there is an audience in the theater.

The lowering of the curtain shall be controlled from not less than two points in the building, one of which shall be designated by the Commissioner of Buildings.

The curtain shall have a steel covering on the outer or auditorium side. The stage side covering shall be of a non-conducting substance of such a thickness and such material as shall stand a test of two thousand degrees F. on the stage side for fifteen minutes and without heating the opposite side to a higher temperature than three hundred and fifty degrees F.

All metal work with the exception of the frame shall be covered with a non-conducting substance on the stage side.

The curtain shall operate vertically in steel guides of such a cross section that the edges shall engage and secure the edges of the curtain and prevent the curtain from leaving the guiding channel or channels if the curtain should tend to buckle or sag either inward or outward. No metal in the guide channels or in the engaging edge of the curtain shall be less than three-eighths ($\frac{3}{8}$) of an inch thick. The joints of the curtain with the proscenium wall, with the stage floor

and with the head of the opening shall be made gas tight as nearly as practicable.

The calculations for the strength of the curtain, the curtain guides and the guide anchors, and the workmanship shall be according to the best modern engineering practice, the stresses in the material and in the various sections of steel shall be within the safe limits of stress described in this ordinance.

No part of a curtain or of the curtain guides shall be supported by or fastened to any combustible material.

The supports of the curtain and the curtain guides and edges and the curtain shall be of sufficient strength to safely resist a pressure of twenty (20) pounds for each and every square foot of the curtain either inward or outward, if such curtain does or does not bag.

No combustible material other than painted decorations shall be applied to the audience side of any such curtain.

Plans for every such curtain shall be approved by the Building Department and a permit obtained for its erection. The Building Department shall inspect such curtain semi-annually, and for each such inspection a fee of two (\$2) dollars shall be charged.

All other openings in such proscenium wall shall have self-closing, regulation standard iron fire doors and iron frames and thresholds; such doors and frames shall be built in such a manner as to resist warping.

Sec. 371. *Stage, Construction of—Fireproof Paint—Scenery—How Treated.*—The framing of the floor of every stage shall be of iron or steel or fireproof material. The stage floor may be of wood, but shall not be less than two and three-fourths inches thick. The entire floor construction and floor or fly galleries, rigging lofts and paint galleries, all railings and supports and stanchions thereon, and all sheaves, pulleys and cables and their supports, shall be of iron or steel. All woodwork, including the under side of floor boards, and all framing for scenery used on or about the stage shall be coated with a fireproof paint, the qualities of which shall be submitted to and approved by the Commissioner of Buildings. All wood used for floor and floor supports shall be coated on the under side with the same kind of paint.

No scenery or stage paraphernalia of any sort shall be used upon the stage of any room used for the purposes of Class V unless such scenery and paraphernalia shall have been treated with a paint or chemical solution which shall make it noninflammable, and which treated scenery or stage paraphernalia, or both, shall be tested and approved by the Fire Marshal.

Sec. 372. *Vestibules for Stage Doors.*—All doorways or openings in the rear or sides of the stage shall be vestibuled or protected in a manner satisfactory to the Commissioner of Buildings, so as to protect the curtain, scenery and auditorium against draughts of air.

Sec. 373. *Structures Over Ceiling—Construction.*—If any structure is built over the ceiling or roof of any theater, the different members of the girders or trusses supporting same shall have their fireproofing double in the manner prescribed for columns of fireproof buildings as specified in the General Provisions of this chapter.

Sec. 374. *Vents—Size Of—Flue Pipes—Dampers—Switches for Dampers.*—One or more vents or flue pipes of metal construction, or other incombustible material, suitable for carrying away smoke, and approved by the Commissioner of Buildings, and extending not less than fifteen feet above

the highest point of the roof, and equivalent in area to one-twentieth of the area of the stage, shall be built over the stage.

In buildings where additional stories are built above the stage, such vents or flue pipes may be carried out near the top of the stage walls, and shall be continued and run up on the exterior of the building to a point five feet above the highest point of such additional story.

All such flues or vents shall be provided with metal dampers, and shall be opened by a closed circuit battery, approved by the City Electrician.

Such dampers shall be controlled by two switches, one at the electrician's station on the stage, which station shall be fireproof, and the other at the city fireman's station, on the opposite side of the stage; such switches shall be located in such places on the stage as are designated by the Fire Marshal, and each shall have a sign with plain directions as to the operation of the same printed thereon.

All fuse boxes shall be surrounded by two thicknesses of fireproof material, with an air space between, and no fuses shall be exposed to the air between the switchboards.

Sec. 375. *Automatic Sprinklers—Location—Tank—Connections.*—There shall be provided an approved system of automatic sprinklers with approved automatic closed circuit electric devices connecting the valves, regulating the flow of water into the various sprinkler pipes with the headquarters of the city fire alarm telegraph, and such other place or places as the Fire Marshal shall direct, so arranged as to prevent any tampering with the system or the shutting off of the water from the sprinkler pipes without automatic notice to the fire department.

Such system of automatic sprinklers shall be supplied with water from a tank located not less than twenty feet above the level of the highest sprinkler head in the system, and it shall be the duty of the firemen provided for in this chapter to include in their daily report the result of an inspection to determine the sufficiency of water in this tank. Automatic sprinklers shall be placed in the paint room, store room, property room, scene storage room, carpenter shop and dressing rooms, if such rooms are in or connected with a building used for the purposes of Class V. Such tank shall not be connected with a standpipe and ladder system, but it shall be filled through a separate pipe from a fire pump, and a three-inch iron pipe shall extend from such tank to the outside of such building with Siamese connections for fire department use. Such entire automatic sprinkler system and equipment and the location thereof shall be subject to the approval of the Fire Marshal.

Sec. 376. *Fire Apparatus on Stage—Hand Fire Pumps—Fire Materials—Hot Air Furnaces.*—A standpipe not less than three inches in diameter, having a hose valve or valves thereon shall be installed on each side of the stage with a hose connection at the stage and at each level above and below the stage, and hose connected thereto at each valve ready for use at all times. Such standpipes shall be connected with a tank on the roof containing not less than three thousand gallons of water, protected from frost, and such tank shall be connected with and supplied by a power pump, all of which shall be subject to the approval of the Fire Marshal. Portable fire extinguishers or hand fire pumps shall always be kept ready for use on and under the stage, in fly galleries and in rigging loft, and in addition thereto at least four fire department axes and six pike poles shall be kept ready for use on each tier or floor of the stage, all of which shall be subject to the approval of the Fire Marshal.

The use of ordinary hot air furnaces or stoves is prohibited.

Sec. 377. *Exits—Diagram of—Printed on Programs.*—It shall be the duty of the owner, lessee or manager of any theater, for any performance in which programs are issued, to cause to be printed on such programs on the page opposite that on which the cast is printed, a diagram showing conspicuously all exits of such building. A diagram of seats on each floor, and the exits leading from each floor, drawn to a scale of one-eighth inch to the foot, shall be hung in a frame within two feet of the ticket seller's window and so as to be easily seen by the public.

Sec. 378. *Independent Lighting System for Exits—Red Light Over Exits.*—All stairways and corridors shall be supplied with a supplementary lighting system of electricity, gas or sperm oil, and such system shall be independent of all other lights in such building, and shall be in operation during the entire period such theater is open to the public and until the audience has left the building. The word "EXIT" shall be in letters at least six inches high over the opening to every means of egress from such theater and a red light, furnished by gas or sperm oil, shall be kept burning over such word "EXIT" at every such opening, during the entire period such theater is open to the public and until the audience has left the building.

Sec. 379. *Fire Alarm Apparatus.*—Every theater shall be provided with an approved system of automatic or manual fire alarm telegraph apparatus, connected by the necessary wires with the headquarters of the city fire alarm telegraph and such other place or places as the Fire Marshal shall direct. The number and location of the boxes and the character of the system, whether automatic or manual or both, shall be determined by the Fire Marshal.

Sec. 380. *Firemen—Employment of—Duties.*—Amended by ordinance June 8, 1908, to read as follows:

It shall be the duty of every person, firm or corporation conducting, operating or maintaining a theater to procure at his, their or its own expense, the attendance at each and every performance, of one fireman who shall be detailed by the Fire Marshal from the regular City Fire Department; he shall be in the uniform of the Chicago Fire Department and he shall be on duty at such theater during the entire time it is open to the public. He shall report to and be subject to the orders of the Fire Marshal and shall see that all fire apparatus required by this Chapter is in its proper condition, ready for use and that all exit doors are unlocked during the entire time such theater is open to the public and are all in efficient and ready working order. During the performance he shall remain on the stage and shall generally perform such duties as may be required of him by the rules and regulations of the Fire Department governing firemen detailed at theaters.

It shall also be the duty of every person, firm or corporation conducting, operating or maintaining a theater to employ, in addition to the fireman hereinbefore provided for, one other experienced and competent person as a private watchman or fireman who shall be approved by the Fire Marshal and who shall be in distinctive uniform and shall be on duty at such theater during the entire time it is open to the public. Such private watchman or fireman shall report and be subject to the orders of the Fire Marshal and it shall be his duty to see that the provisions of this Chapter are complied with in all portions of the theater occupied and used by the public, and that all exit doors are unlocked during the

entire time such theater is open to the public, and in efficient and ready working order. The city fireman and Fire Marshal shall require a drill of the employees of such theater, including such private watchman or fireman, in the use of all apparatus and appliances for the prevention of fire inside the building and the saving of life, at least twice in every week, and such city fireman shall report to the Fire Marshal the manner and efficiency of such drill. Such city fireman shall report in writing daily to the Fire Marshal the condition and equipment of the theater to which he is detailed. No city fireman shall be on duty at any one theater for a longer period than two weeks.

The compensation to be paid the city for the services of such city fireman so detailed shall be based on the regular salary paid by the city to such fireman and shall be computed according to the ratio between the number of hours such fireman is required by his duties hereunder to devote to such theater and the total number of hours such fireman is employed by the city for all purposes. All sums received by the city under the provisions of this section shall be for the use and benefit of the Fire Department.

Sec. 381. *Amusement License.*—The amusement license issued for each theater shall state the number of permanent seats it contains, which number shall be governed by the provisions of this chapter relating thereto, and no more than that number of persons shall be permitted in such theater at any one time.

No license for the operation of a theater shall be issued unless the Commissioner of Buildings, Fire Marshal and City Electrician shall first have certified, in writing, that such theater complies with the provisions of this chapter in every respect.

Sec. 382. *Lighting—All Parts Well Lighted During Performance.*—Every portion of any theater, devoted to the uses or accommodation of the public, and all outlets therefrom, to the streets, including open courts, corridors, stairways, exits and emergency exit stairways, shall be well and properly lighted during every performance, and the same shall remain lighted until the entire audience has left the premises.

Sec. 383. *Lights, Control of Lights in Halls, Corridors and Lobbies—Separate Shut-off—Connections With Gas Mains—Independent Connections—Protection of Suspended and Bracket Lights—Protection of Lights Inserted in Walls—Protection of Footlights—Construction of Border Lights—Ducts and Shafts Conducting Heated Air from Lights—Gas Stage Lights to Have Metal Screens.*—All gas or electric lights in the halls, corridors, lobbies or any other part of any theater used by the audience, except the auditorium, shall be controlled by a separate shut-off located in the lobby and controlled only in that particular place. Gas mains supplying such theater shall have independent connections for the auditorium and the stage and provision shall be made for shutting off the gas from the outside of the building. All suspended or bracket lights surrounded by glass, in the auditorium, or in any other part of the theater, shall be provided with proper wire netting underneath. No gas or electric lights shall be inserted in the walls, woodwork, ceiling, or in any part of the theater unless protected by fireproof materials. In case gas is used, for the footlights, in addition to the wire network, they shall be protected by a strong wire guard, not less than two feet distant from such footlights, and the trough containing such footlights shall be formed of and surrounded by fireproof material. All border lights shall be constructed according to the best known methods, and subject to the

approval of the Fire Marshal and the City Electrician, and shall be suspended by wire ropes. All ducts and shafts used for conducting heated air from the main chandelier, or from any other light or lights, shall be constructed of metal and made double, with an air space between. All gas stage lights shall have strong wire metal guards or screens, not less than ten inches in diameter, so constructed that any material coming in contact therewith shall be out of reach of the flames of such lights, and shall be soldered to the fixtures in all cases.

The use of calcium lights in any theater is prohibited. All arc lights used on the stage shall be at all times subject to the approval of the City Electrician, and no arc lights shall be used on any stage unless approved by the City Electrician.

Sec. 384. *Fire Apparatus to Be Under Control of Fire Department.*—The standpipes, automatic sprinklers, gaspipes electric wires, hose, footlights, fire alarm boxes, fireproof proscenium curtains, switch boxes, ventilators, controlling levers, axes and pike poles, and all apparatus for the extinguishing of fire or guarding against same, as provided for by this chapter, shall be made and kept at all times in condition satisfactory to and under control of the Fire Marshal.

Sec. 385. *Officers Empowered to Enter Buildings.*—The Commissioner of Buildings, Fire Marshal, City Electrician, Superintendent of Police, or any of them, and their respective assistants, shall have the right to enter any buildings used wholly or in part for the purposes of Class V and any and all parts thereof, at any reasonable time, and at any time when occupied by the public, in order to examine such buildings and to judge of the condition of the same and to discharge their respective duties, and it shall be unlawful for any person to interfere with them or any of them in the performance of their duties.

Sec. 386. *The Commissioner of Buildings, Fire Marshal, City Electrician or Superintendent of Police Shall Close Buildings for Violations.*—The Commissioner of Buildings, Fire Marshal, City Electrician or Superintendent of Police, or any of them, shall have the power and it shall be their joint and several duty to order any building used wholly or in part for the purposes of Class V closed, where it is discovered that there is any violation of the provisions of this chapter, and to keep same closed until such provisions are complied with.

Sec. 387. *License—Mayor Shall Revoke.*—Upon a report to the Mayor by the Commissioner of Buildings or Fire Marshal or City Electrician or the Superintendent of Police that any requirement of this chapter, or that any order given by them or any of them, in regard thereto, has been violated, or not complied with, the Mayor shall revoke the license of any such theater or place of public amusement so reported and cause the same to be closed.

ARTICLE IX.

PROVISIONS RELATING SOLELY TO CLASS VI.

In Class VI shall be included every tenement and apartment house; that is to say, any house or building, or portion thereof, which is used as a home or residence for two or more families living in separate apartments.

Sec. 388. *Walls of Class VI—Thickness of.*—Buildings of Class VI shall conform to the following requirements:

The thickness of enclosing walls of buildings of Class VI shall be made in accordance with the following table, to-wit:

	STORIES											
	Basement.	1	2	3	4	5	6	7	8	9	10	11 12
Basement and	12	8										
Two-story	12	12	8									
Three-story	16	12	12	12								
Four-story	20	16	16	12	12							
Five-story	20	16	16	16	12	12						
Six-story	20	20	16	16	16	12	12					
Seven-story	24	24	20	20	16	16	12	12				
Eight-story	24	24	24	20	20	16	16	12	12			
Nine-story	28	24	24	20	20	16	16	12	12			
Ten-story	28	24	24	24	20	20	16	16	12	12		
Eleven-story	28	28	24	24	24	20	20	16	16	12	12	
Twelve-story	32	28	28	24	24	24	20	20	16	16	12	12

Provided, however, in buildings of steel skeleton fireproof construction, thickness of walls shall be governed by the provisions of Section 510 of this chapter.

Walls Around Stairs, Elevators and Shafts.—See Section 588.

Walls—Reinforced Concrete.—See Section 554.

Sec. 389. *Definitions.*—"New tenement house" includes every tenement house hereafter erected and every such new tenement house which shall be increased or diminished in size or otherwise altered after its erection, and every building now or hereafter in existence not now used as a tenement house, but hereafter converted or altered to such use.

"Apartment" is a room or suite of two or more rooms occupied or intended or designed to be occupied as a family domicile.

"Yard" is an open, unoccupied space, on the same lot with a tenement house, separating every part of every building on the lot from the rear line of the lot.

"Court" is an open, unoccupied space, other than a yard, on the same lot with a tenement house; a court entirely surrounded by a tenement house is an "inner court;" a court bounded on one side and both ends by a tenement house and on the remaining side by a lot line is a "lot line court;" a court extending to a street alley or yard is an "outer court."

"Shaft" includes exterior and interior shafts, whether for air, light, elevator, dumb waiter or any other purpose; a "vent shaft" is one used solely to ventilate or light a water closet compartment, bath room, or pantry.

"Public Hall" is a hall, corridor or passageway, not within an apartment.

"Stair Hall" includes the stairs, stair landings, and those portions of the public halls through which it is necessary to pass in getting from the entrance floor to the top story.

"Basement" is a story partly, but not more than one-half—"Cellar" is a story more than one-half—below the level of the street grade nearest the building; where the grade of a street adjacent to a tenement house varies, the mean or average grade of such street opposite the lot containing the tenement house shall be regarded as the grade of such street within the meaning of this chapter.

"Story" is that portion of a building between the top of any floor beams and the top of the floor or ceiling beams next above.

A good quality of brick, laid in lime mortar, of strength and character equal to the requirements of Section 587 of this chapter, for brick walls, shall be taken as the standard of strength and stability for "solid masonry," but any other fireproof materials of equal strength and stability to the above standard may be substituted for brick.

Sec. 390. *Construction of Partitions Between Apartments in Frame Buildings.*—Every new tenement house more than

five stories and basement high shall be of fireproof construction (according to the definition of "fireproof construction" contained in Section 500 of this chapter); every new tenement house more than three stories and basement high, but not more than five stories and basement high, shall be of "slow-burning" or "fireproof construction" (according to the definition of "slow-burning" or "fireproof construction" as defined in this chapter). In case slow-burning construction be used the cellar and basement construction, including the floor construction of the first story above the cellar or basement, shall be of fireproof construction. In all new frame tenement houses outside the fire limits of the city each suite of apartments shall be separated from the next suite in such building by a wall of four-inch tile or metal studding and metal lath.

As amended by ordinance of October 22, 1906.

In all new frame tenement houses outside the fire limits of the city, each suite of apartments shall be separated from the next suite in such building by a wall of incombustible material of such character as the Commissioner of Buildings may require.

Sec. 391. *Joists—Supports for.*—If in buildings of Class VI the distance between the enclosing walls is more than twenty-four feet in the clear, there shall be intermediate supports for the joists, which supports shall be either brick walls or iron or steel. If brick walls are used for this purpose they may, in all cases where the thickness of walls is given in the table as 16 inches or more, be made 4 inches less in thickness than the dimensions stated in the table.

Walls—Ledges in.—See Section 588.

Sec. 392. *Fire Escapes.*—Every tenement house four or more stories in height shall be provided with a fire escape or fire escapes, such as are required by the statutes of this state and the ordinances of the city. In every case each separate apartment shall have direct access to at least one such fire escape unless such apartment shall have direct access (without passing through any other apartment) to at least two separate flights of stairs leading to the ground, one of which is placed in front and one in the rear of such building, and one of which may be placed outside of the building; but where such separate apartment shall not have access to two such flights of stairs, then there shall be a metal stairway between the balconies of every such fire escape, securely fastened to the walls of the building not less than two feet wide, with a proper hand rail, instead of the usual vertical ladder. Every court in which there shall be a fire escape shall have direct and unobstructed access along the surface of the ground to a street, alley, or yard opening into the alley or street, without entering into or passing through or over any building, unless by a four-foot wide fireproof passage on the court or ground level.

Sec. 393. *Fire Escapes to Be Painted.*—Every new fire escape shall be painted with two coats of durable paint, one put on in the shop and the other at once upon the erection of such fire escape.

Sec. 394. *Bulkheads and Scuttles—Stairs to.*—Every tenement house shall have in the roof a bulkhead or scuttle, fireproof or covered with fireproof materials, with stairs or ladder leading thereto; no such roof opening shall be less than two feet by three feet. No scuttle or bulkhead door shall have upon it any lock, but may be fastened on the inside by movable bolts or hooks.

Sec. 395. *Stairs and Halls—In Case of Alterations—Requirements.*—Every now existing and every new tenement

house shall have at least two flights of stairs, which shall extend from the entrance floor to the top story. Such stairs and the public halls in every tenement house shall each be at least three feet wide in the clear, and every apartment shall be directly accessible from both such flights of stairs. If any existing tenement house be so altered as to increase the number of apartments therein, or if such building be increased in height, or if the halls and stairs therein be damaged by fire or otherwise to an extent greater than one-half the original cost thereof, the entrance, stair halls, entrance halls and other public halls of the whole building shall be made to conform to the requirements of this chapter as to new tenement houses.

Sec. 396. *Railings and Guards.*—In every tenement house all stairways shall be provided with sufficient railings and guards.

Sec. 397. *Stairs in Non-Fireproof Buildings, Eighty to One Hundred and Twenty Rooms.*—Every new non-fireproof tenement house containing over eighty rooms, exclusive of bath rooms, shall have one additional flight of stairs (over and above the flights hereinbefore provided for) for every additional eighty rooms, or fraction thereof; but if such building contains not more than one hundred and twenty rooms, exclusive of bath rooms, at the owner's option, in lieu of an additional stairway, the stairs and public halls throughout the entire building shall be at least one-half wider than is provided in Sections 395 and 402 of this chapter.

Sec. 398. *Stairs in Fireproof Buildings One Hundred and Twenty Rooms and Upward.*—Every new fireproof tenement house containing over one hundred and twenty rooms, exclusive of bath rooms, shall have one additional flight of stairs (over and above the flights hereinbefore provided for) for every additional one hundred and twenty rooms or fraction thereof; but if such buildings contains not more than one hundred and eighty rooms, exclusive of bath rooms, at the owner's option, in lieu of an additional stairway, the stairs and public halls throughout the entire building shall be made at least one-half wider than is provided in Sections 395 and 402 of this chapter.

Sec. 399. *Stairs—Entrance to—Treads and Risers.*—Every flight of stairs required in a tenement house shall have an entrance on the entrance floor from a street or alley, or from a yard or court which opens into a street or alley. All stairs except rear stairs, in new tenement houses, shall have risers not more than seven and three-quarters inches high and treads not less than nine and one-half inches wide exclusive of nosings, except in winding stairs, where all treads at a point eighteen inches from the strings on the well side shall be at least nine and one-half inches wide, exclusive of nosings.

Sec. 400. *Stairs and Stair Halls—Over Three Stories—Fire-Resisting Glass.*—The stairs and stair halls in all new tenement houses more than three stories and basement high shall be constructed of incombustible material throughout, except that the treads of stairs (not less than one and three-fourths inches thick) and all hand rails, may be of hard wood. All windows in stair halls in new tenement houses more than three stories and basement high opening on inner courts or shafts shall be of good quality fire-resisting glass.

Sec. 401. *Stair Halls Enclosed in Masonry—Requirements and Exceptions.*

Amended by ordinance of February 18, 1907, to read as follows:

In every new non-fireproof tenement house all stair halls shall be enclosed on all sides with the walls of solid masonry of the same dimensions and thickness as specified for enclosing walls. All windows in such stair halls shall have metal frames and sashes, glazed, fire-resisting glass and such windows shall be stationary. This section shall not apply to tenement houses which are not more than three (3) stories and basement high with only one apartment on each floor.

Sec. 402. *Entrance Halls—Solid Masonry—Exceptions—Ceilings.*—Every main entrance hall in a new tenement house shall be at least three feet six inches wide in the clear from the entrance up to and including the stair enclosure, and beyond this point at least three feet wide in the clear. In every new non-fireproof tenement house, except where there is only one apartment on each floor, such entrance hall shall be inclosed with solid masonry walls and with ceilings covered with incombustible material and shall comply with all the conditions of the preceding sections of this chapter as to the construction of stair halls. If such main entrance hall is the only entrance to more than one flight of stairs, the several portions of such main entrance hall which separate the entrance of the building from the several flights of stairs respectively shall be increased respectively at least one foot in width for each additional flight of stairs.

Sec. 403. *Frame Buildings Not to Be Enlarged.*—No wooden frame tenement house within the fire limits shall be enlarged either by adding to its height or to its superficial area.

Sec. 404. *Bay Windows—Vent Shafts—Openings.*

Amended by ordinance of February 8, 1907, to read as follows:

All bay windows and all shafts and courts, in masonry constructed new tenement houses, shall have the walls of the bay windows, shafts and courts built of brick or other fireproof construction throughout. This section shall not apply to enclosures about elevators which are in common with a stairway surrounded and enclosed in masonry walls.

Sec. 405. *Apartments Divided by Masonry.*—There shall be a wall of solid masonry of the same thickness as required for outside walls in buildings of this character, extending from the ground to the roof between each set of apartments and around each well hole, court or light shaft; provided, however, that the wall between apartments above the first story extending from a main stair hall to the outer wall of the building may jog or set over to some point toward the center of the building to provide or allow for an even distribution of space of the rooms adjacent to the same; provided, however, that such wall above the first story, if supported on iron or steel beams (which shall extend from the brick wall surrounding the main stair hall to the outer wall of the building at each succeeding story), shall be not less than eight inches in thickness, but all brick walls between apartments and around each well hole, court or light shaft which extend from the ground to the roof and above the first story of an apartment building not supported as above described in this section, shall be of the thickness prescribed for buildings of this class in Section 388 of this chapter.

Sec. 406. *Space Occupied on Lot—Plat Measurements.*—No new tenement house, alone or with other buildings now or hereafter erected, shall occupy above the first story more than eighty-five per centum of the area of a corner lot or more than ninety per centum of the area of such corner lot, if such corner lot is bounded on three sides by streets or alleys,

or more than seventy-five per centum of the area of any other lot, provided, that the space occupied by fire escapes, constructed and erected according to law and not more than four feet wide, shall be deemed unoccupied.

At the time of applying for a permit for the erection of a new tenement house the applicant shall submit a plat of the lot showing the dimensions of the same and the position to be occupied by the proposed building, and the position of any other building or buildings that may be on the lot. The measurements shall in all cases be taken at the top of the first story and shall not include any portion of any street or alley.

Sec. 407. *Corner Lot Defined—Frontages—Triangular Lots.*—By "corner lot" is meant a lot situated at the junction of two streets or of a street and public alley not less than sixteen feet in width. Any portion of the width of such lot distant more than fifty feet from such junction shall not be regarded as part of a corner lot, but shall be subject to the provisions of this chapter respecting other than corner lots.

Where, in corner lots, the two frontages are of unequal length, the lesser street frontage shall be taken as the width of the lot. Street frontage alone and not alley frontage shall be considered in determining such lesser frontage. No existing tenement house shall hereafter be enlarged or its lot be diminished or other buildings be placed on its lot, so that after such change a larger proportion of any corner lot or other lot upon which it is situated is covered by buildings than the aforesaid proportions, respectively; provided, however, that in case of a lot triangular or irregular in shape, bounded on two or more sides by a street and having a number of lineal feet street frontage exceeding one-twentieth of the number of square feet in the area of such lot, it shall not be necessary to comply with the conditions of this section as to percentage of lot to be covered; and provided, further, that there shall be no violation of Section 411 of this chapter in the erection of any tenement house.

Amended October 22, 1906, by the substitution of the word "exceeding" in lieu of the word "extending," in fourth line from bottom of section.

Sec. 408. *Fire Walls—When Dispensed With.*—Fire walls of brick not less than twelve inches thick shall be built, extending above the roofs of all adjoining buildings, if such roofs are flat, and also where the building stands upon any line of any lot, excepting street or alley lines. Provided, that where eight-inch walls are permitted in the top story of buildings, or where the building is not over three stories high, the fire walls may be eight inches thick. Such fire walls, where they stand upon lot lines or where they are over the dividing walls between buildings or over the dividing walls in the interior of buildings, where such are called for by this chapter by reason of the great area of such buildings, shall extend at least two feet above the roofs of such buildings. Fire walls upon street and alley lines shall extend not less than eighteen inches above the roofs of such buildings. Fire walls may be dispensed with on street and alley lines, if the top of the roof boards and roof joists are protected against fire for a distance of at least five feet from such street or alley lines by a coating of mortar or hollow tile or porous tile at least two inches thick. Fire walls at street and alley lines may also be dispensed with in all cases where the entire framing and material of the roof shall be made strictly fireproof.

Walls facing upon courts and light shafts shall be treated as in the same category with walls facing upon streets and alleys.

Fire walls shall be covered with a weatherproof coping of incombustible material.

Sec. 409. *Height—How Measured.*—The height of a new tenement house shall not by more than one-half exceed the platted width of the widest street on which it abuts.

Provided, however, that any distance the building sets back from the lot line shall be added to the width of the street in making this computation, but no existing tenement house shall be increased beyond such height. Such height shall be the perpendicular distance from the grade nearest the house to the highest point of the roof (not including as part of the roof any cornice or bulkhead less than eight feet high, or any elevator enclosure less than sixteen feet high). Where such street grade varies, the mean or average grade thereof opposite such house shall be the datum from which such height shall be measured.

Sec. 410. *Alley or Yard in Rear—Must Have—Size of Yard Increased.*—At the rear of every lot containing a new tenement house (unless the rear of such lot abuts upon a public alley at least ten feet wide) there shall be a yard open and unobstructed from the earth to the sky, except by fire escapes not more than four feet wide, constructed and erected according to law; every part of such yard shall be directly accessible from every other part thereof; such yard shall on corner lots (as above defined) have an area of at least eight per centum of the superficial area of the lot, and shall on other lots have an area of at least ten per centum of the superficial area of the lot. Every such yard shall be increased one per centum of the superficial area of the lot for every story above three stories in height of the tenement house situated thereon, and in no case shall such yard separate any building on such lot by less than ten feet from the rear line of the lot at the nearest point of approach of such building to such rear line.

For the purpose of construing and enforcing this section, the rear of the lot shall be held and deemed to be that part of the lot that is farthest from the line of the street upon which the proposed building will face, and in case where the proposed building will stand upon a corner lot or tract of land abutting upon two streets and an alley, in all such cases the proposed building or buildings may extend from the front to the rear of such lot or tract. Nothing herein contained shall conflict with or modify any other provision of this ordinance.

As amended by ordinance January 8, 1906.

Sec. 411. *Requirements in Case of Enlarging—Distance between Buildings.*—Amended by ordinance March 23, 1908, to read as follows:

No existing tenement house shall (unless the rear of the lot upon which it stands abuts upon a public alley at least ten feet wide) hereafter be enlarged or its lot line be diminished so that any building on such lot shall at any point approach nearer than ten feet to the rear line of the lot. Where a tenement house, now or hereafter, erected, stands upon a lot other than a corner lot, no other building shall hereafter be placed upon the front or rear of that lot, unless the minimum distance between such buildings be at least ten feet, if neither building exceeds the height of one story; or fifteen feet if either building exceeds the height of one story, but not the height of two stories; and so on, five additional feet to be added to such minimum distance of ten feet for every story more than one in the height of the highest building on such lot: Provided, however, that where a fireproof passageway seven feet in height and five feet wide with fireproof doors not less than four feet wide leading from the street to the yard and properly lighted is constructed, connected with the yard, so that the lowest portion of said fireproof

passageway shall not extend more than four feet below the level of the sidewalk grade, said fireproof passageway shall be taken and accepted in lieu of the ten feet required herein between the rear of said building and the rear line of the lot where the yard and court comply with the requirements of Section 410 of the Revised Municipal Code of Chicago of 1905, as amended January 8, 1906: Provided, however, in case such fireproof passageway is constructed, there shall be for at least fifteen feet along the lot line a yard, and in no case shall such yard separate any building on such lot by less than ten feet from the rear line of the lot at the nearest point of approach of such building to the rear lot line, and that all parts of such yard shall be open and unobstructed from the earth to the sky, except by stairways or fire-escapes and their necessary porches and landings which shall be constructed entirely of iron, concrete or incombustible material. And such fireproof passageways thus connecting with the yard shall only be permitted in connection with buildings or structures built on a corner lot facing upon two streets. Nothing herein contained shall conflict with or modify any other provision of this chapter.

Sec. 412. *Courts, Porches.*—Every court of every new tenement house shall be open and unobstructed at every point thereof from the bottom thereof to the sky, save by fire escapes or stairs or landings constructed and erected according to law and projecting not more than four feet into courts, which courts shall communicate directly without obstruction into a street, alley or yard. Where porches are constructed in courts, the amount of area of unobstructed space in such courts shall be exclusive of space occupied by stairs and porches. No rear porch shall be constructed which is more than eight feet in width where the construction is of combustible material, and no such rear porches shall be enclosed with other than incombustible material, as defined in Section 506 of this chapter.

Sec. 413. *Rooms—Habitable—Windows—Vent Shafts.*—Amended by ordinance Nov. 25, 1907, to read as follows:

In every new tenement house every habitable room, excepting water closet compartments and bath rooms, shall have all windows open direct upon a street, alley, yard or court. The total area of the windows opening from such room (other than water closet compartments and bath rooms) upon a street, alley, yard or court, shall be at least one-tenth of the floor area of that room, and the top of at least one window shall be not less than seven feet above the floor, and the upper half of that window shall be made so as to open its full width. No window in any such room (other than pantries, water closet compartments and bath rooms) shall have less than ten square feet glass area, and in no such water closet compartment or bath room shall the total window area be less than three square feet glass area, or the width of any window less than one foot; and when any window ventilating any water closet compartment or bath room in any new tenement house opens into a vent shaft, no window from any room other than a water closet compartment, bath room, pantry or hall shall open into such vent shaft.

Sec. 414. *Windows in Lot Line Walls.*—Windows in addition to those provided for in Section 413 of this chapter, if placed in any lot line wall or in any wall nearer to the lot line than is specified in Section 416 of this chapter from such lot line, then the sash in such window shall be stationary and glazed with fire-resisting glass.

Section 414 repealed in its entirety by ordinance of February 18, 1907. (page 3336, Council Proceedings).

Sec. 415. *Courts—Inner—Sizes Of—Lot Line Courts.*—The "inner courts" of all new tenement houses as defined in Section 389 of this chapter shall have areas and minimum widths in all parts not less than the widths and areas as follows:

Buildings.	Square Feet.	Least Width.
2 stories	100	6 feet
3 stories	120	7 feet
4 stories	160	8 feet
5 stories	250	12 feet
6 stories	400	16 feet
7 stories	625	20 feet
8 stories	840	24 feet

"Lot line courts" shall have areas and minimum widths in all parts not less than one-half of those specified in the above table of "inner courts."

Sec. 416. *Courts—Outer—Sizes Of—Width Increased.*—The "outer courts" of all tenement houses defined in Section 389 of this chapter shall have not less than the following widths for their minimum in all parts:

Buildings.	Least Width.
2 stories	3 feet
3 stories	3 feet 6 in.
4 stories	4 feet
5 stories	6 feet
6 stories	8 feet
7 stories	10 feet
8 stories	12 feet

If the outer or lot line court has windows on opposite sides of the same, the least widths given in the above table for outer courts shall be doubled.

Sec. 417. *Rooms—Sizes and Height Of—Attic and Janitor's Rooms.*—In every new tenement house, all rooms, except water closet compartments and bath rooms, shall be of the following minimum sizes: In each apartment there shall be at least one room containing not less than one hundred and twenty square feet of floor area, and every other room shall contain at least seventy square feet of floor area. Each room shall be in every part not less than eight feet six inches high from the finished floor to the finished ceiling, but an attic room need be eight feet six inches high in but one-half of its area; provided, that in a basement apartment used for janitor's use only, such room or rooms shall be not less than eight feet high in the clear.

Sec. 418. *Rooms—Changes in Existing.*—No room in any now existing tenement house shall hereafter be constructed, altered, converted or occupied for living purposes unless it contains a window having a superficial area not less than one-twelfth the floor area of the room, which window shall open upon a street or alley or upon a yard or court having a superficial area of not less than twenty-five square feet; or unless such room adjoins another room in the same apartment, which other room shall have such a window opening upon such a street, alley, yard or court, and between which two adjoining rooms there shall be a sash window having at least fifteen square feet of glazed surface, the upper half of which shall be so made as to open easily.

Sec. 419. *Windows—Courts—Attic.*—No room in any now existing tenement house which has no such window, as aforesaid, opening upon a street or alley or upon a yard or court having a superficial area of not less than twenty-five square feet, shall hereafter be constructed, altered, converted or occupied for living purposes, unless it contains a floor area

of at least sixty square feet and also at least six hundred cubic feet of air space; nor unless every part of the finished ceiling of such room be at least eight feet distant from every part of the finished floor thereof; provided, that an attic room need be eight feet high in but one-half of its area and such attic room shall not be used for purposes of human habitation other than as a sleeping room.

Sec. 420. *Air—Quantity of for Each Person.*—No room in any tenement house shall be so occupied that the allowance of air to each person living or sleeping in such room shall at any time be less than four hundred cubic feet for each such person more than twelve years old and two hundred cubic feet for each such person of the age of twelve years or under.

Sec. 421. *Alcoves.*

Amended by ordinance of February 18, 1907, to read as follows:

Alcove rooms must conform to all the requirements of other rooms, except that in one or two-story existing buildings which it may be desired to raise or alter, every alcove shall be deemed a separate room for all purposes within the meaning of this ordinance, except such an alcove as, adjoining another room, has at least twenty per centum of entire wall surface of alcove opening to another room.

Sec. 422. *Light in Halls—Recesses—Returns—Doors In.*—

In every new tenement house every public hall shall be lighted by at least one window in each story opening directly upon a street, alley, yard or court, or by a skylight. Such window shall be so placed that light may pass directly through it and the hall to the opposite end of the hall, or else there shall be at least one window opening directly upon a street, alley, yard or court in every twenty feet in length or fraction thereof of every such hall, except in so much of any entrance hall as lies between the entrance and the flight of stairs nearest the entrance. In any such public hall, recesses or returns, the length of which do not exceed twice the width of the hall, will be permitted, without an additional window, but otherwise each recess or return shall be regarded for the purposes of this section as if it were a separate hall. Any part of a public hall which is shut off from any other part by a door or doors shall be deemed a separate public hall within the meaning of this section.

Sec. 423. *Public Halls—Windows In.*—In every new tenement house one at least of the windows provided to light each public hall or part thereof shall have a glass area of at least twelve square feet.

Sec. 424. *Rooms and Halls—Additional.*—Any additional room or hall that may hereafter be constructed or created in an existing tenement house shall comply in all respects with the provisions of this chapter as to size, arrangement, light and ventilation of rooms and halls.

Sec. 425. *Shafts—Inner and Outer Vent—Dimensions.*—Inner or outer vent shafts of all tenement houses as defined in Section 389 of this chapter shall be of the following dimensions:

Building.	Square Feet.	Least Width.
2 stories	22½	3 feet
3 stories	27	3 feet
4 stories	36	3 feet
5 stories	48	5 feet
6 stories	72	6 feet
7 stories	96	8 feet
8 stories	120	8 feet

Sec. 426. *Skylight Over Stairs—Ventilating—Area Of.*—In every new tenement house there shall be in the roof, directly over each stair well, a ventilating skylight, which shall have a glazed surface of the following dimensions: Where such tenement house shall not exceed two stories in height, and covering a superficial ground area of not to exceed sixteen hundred square feet, the glazed surface in such ventilating skylight shall be not less than fifteen square feet in area. For a three-story building, with a superficial ground area of not to exceed sixteen hundred square feet, the glazed surface of such ventilating skylight shall be not less than twenty square feet in area. For all buildings in excess of three stories and covering a superficial ground area in excess of 1,600 square feet, the glazed surface of such ventilating skylight shall be not less than twenty-five square feet in area; provided, however, that such ventilating skylights shall not be required in any of such buildings where the stairways are lighted by a window on each story landing.

If the building is more than three stories high, the skylights shall have at least six inches above same a strong wire netting (wire not lighter than No. 8 and a mesh not coarser than one and one-half by one and one-half inches) unless the glass contains a wire netting within itself.

Sec. 427. *Flues in Walls.*—In every new tenement house there shall be adequate flues in walls of masonry not less than forty-nine square inches area in each chimney running through every floor, with an open fireplace or grate or place for a stove, properly connected with one of such chimney flues, for every apartment, every additional flue used shall not be of less size than the above.

Sec. 428. *Cellar and Basement—Ceilings—Ventilation.*—Amended by ordinance Nov. 25, 1907, to read as follows:

All cellars and basements shall be ventilated at each end, and where boilers or furnaces are located the ceiling over the boiler or furnace, extending for two feet beyond boiler or furnace in each direction, shall be covered with metal lath and plastered, or any other incombustible material approved by the Commissioner of Buildings.

Sec. 429. *Damp-Proofing—Basement Walls and Floors.*—Every new tenement house shall have all its outside walls below the adjacent ground level plastered on the outside with Portland cement or treated with other approved damp-proofing material, and such walls, as high as the ground level, shall be laid in cement mortar. The basement or cellar shall have a floor of Portland cement concrete not less than three inches in thickness.

Sec. 430. *Cellar Changed for Living Purposes—Requirements—Height.*—In no new existing or new tenement house shall any room in the cellar be constructed, altered, converted or occupied for living purposes; and no room in the basement of a tenement house shall be constructed, altered, converted or occupied for living purposes, unless all of the following conditions of this chapter be complied with, and at least one-third of the height of the basement shall be above grade for building; provided, in each case it shall be at least four feet above the street grade. Such rooms shall be at least 8 feet 6 inches high in all now existing or new tenement houses in every part, from floor to the ceiling, except as provided for janitor's use only in Section 417 of this chapter.

Sec. 431. *Water Closet.*—There shall be appurtenant to such room or apartment, a water closet conforming to the regulations and ordinances of the city relating to water closets.

Sec. 432. *Shafts, Arcas, Etc., to Extend Two Inches Below the Floor—Graded—Concreted—Drained.*—In every new tenement house, the bottom of all shafts, courts and yards which extend to the basement and light and ventilate the living rooms in such basement shall, by means of areas, not less than two feet six inches in their least dimension or otherwise, be extended a distance of at least two inches below the floor level of the part intended to be occupied. All shafts, inner courts and areas which extend to the ground shall be properly concreted, and all shafts, inner and lot line courts and areas shall be properly graded and drained, and shall be so connected with a street sewer through an intermediate trap or surface basin (where such a sewer is adjacent to the lot), that all water may be drained freely into it.

Sec. 433. *Sinks—Requirement.*—In every new tenement house there shall be in each apartment at least one proper sink with running water. In every now existing tenement house there shall be on every floor at least one proper sink with running water, accessible to all the tenants of that floor, without passing through any other apartment, if there be not one such sink in each apartment. In no tenement house shall there be woodwork inclosing sinks located in the public halls; the space underneath sinks shall be left entirely open.

Sec. 434. *Water Closets—Access to—Windows in—Artificial Light.*—In every new tenement house there shall be a separate water closet in a separate compartment within each apartment, accessible to each apartment, without passing through any other apartment, provided that where there are apartments, consisting of only one or two rooms, there shall be at least one water closet for every two apartments. Every water closet compartment in every new tenement house shall have a window opening upon a street, alley, yard, court or vent shaft, and every water closet compartment in every existing tenement house shall be ventilated by such a window, or else by a proper ventilating pipe running through the roof. Every water closet compartment in every tenement house shall be provided with proper means of artificially lighting the same. If fixtures for gas or electricity are not provided in any such compartment, then the door thereof shall have ground glass or wire glass panels or transoms.

Sec. 435. *Sanitary Requirements.*—No drip trays shall be permitted in new tenement houses. All water closet fixtures in every new tenement house shall be constructed and set up comfortably to the requirements of the Department of Health. All privy vaults used in connection with any existing tenement house shall be replaced by water closets, constructed and set up in conformity with the provisions of this chapter, whenever connection with a public sewer is in any way practicable, and the Department of Health of the city shall be the sole judge as to the practicability of such connection with the public sewer. At least one such water closet shall be provided for every two apartments in each existing tenement house, and such water closets may be located in the yard if necessary. If so located, long hopper closets may be used, provided all traps, flush tanks and pipes be protected against frost.

Sec. 436. *Loads—Allowance for Live Loads in Construction of Floors.*—For all buildings of Class VI the floors shall be designed and constructed in such a manner as to be capable of bearing in all their parts, in addition to the weight of the floor construction, and including the weight of partitions and permanent fixtures and mechanisms that may be set upon the same, a live load of forty pounds for every square foot of surface in such floors.

Sec. 437. *Pipes Through Floors.*—In every new tenement house where plumbing or other pipes pass through floors or partitions, the openings around such pipes shall be sealed or made air tight with plaster or other incombustible material, so as to prevent the passage of air or the spread of fire from one floor to another or from room to room.

Sec. 438. *Catch Basins.*—The covers of all catch basins in lots containing tenement houses shall be of stone or iron, and shall be placed in courts or yards flush with the surface of such courts or yards, so that access to such basins may be convenient.

Sec. 439. *Stairways—Fire Escapes to be Free From Incumbrance.*—No incumbrance of any kind shall at any time be placed before, upon or against any stairway, steps or landings or fire escapes in or upon any tenement house. All fire escapes upon tenement houses shall be kept in good order and repair, and every exposed part thereof shall at all times be protected against rust by durable paint.

Sec. 440. *Water Closets—Access To.*—In every apartment of three or more rooms in every new tenement house convenient access from the outer door to the apartment to every living room and to every bedroom, and to every room used as a bedroom, and to at least one water closet compartment, shall be provided otherwise than through any bedroom or room used as a bedroom.

Sec. 441. *Buildings Damaged by Fire, Etc.*—If any existing tenement house is hereafter damaged by fire or other cause (including ordinary wear) so that at any time its value be less than one-half its original cost (exclusive of the value of the foundations) such building shall not be repaired or rebuilt except in conformity with the provisions of this chapter applicable to new tenement houses.

Sec. 442. *Changes or Alterations—Permits.*—Every new tenement house and all changes or alterations in any existing tenement house shall conform to the requirements of this chapter. No new tenement house shall be begun, nor shall any changes or alterations in any existing tenement house, such as are referred to in this chapter, be begun until a permit therefor shall have been issued by the Building Department of the city. Such permit shall be issued only upon an application by the person for whom the building is to be erected or altered, and after approval of the plans and specifications of such tenement house, or such changes or alterations by the Health Department of the city whenever such approval is required by law or ordinance.

Sec. 443. *Notice to be Sent to Commissioner of Buildings to Inspect—Certificate to be Issued—Notice to Inspect to be Filed.*—It shall be the duty of the owner or his agent, when a tenement house is in course of erection, to notify the Commissioner of Buildings of the city when the building is or will be ready for lathing, and the Commissioner shall, within three days of the time specified, cause an inspection to be made, and if the construction is found to be in accordance with the requirements of this chapter he shall issue or cause to be issued a certificate to that effect; otherwise he shall cause the penalties provided in Section 445 of this chapter to be enforced. The Commissioner shall file for reference the notice received and shall also file a copy of the certificate in the office of the Building Department.

Sec. 444. *Yards, Courts, Etc.—Must Comply as to.*—Any tenement house not conforming in itself and in its yard, courts, areas and shafts to the requirements of this chapter

shall not be occupied, or if found occupied shall forthwith be vacated upon notice from the Commissioner of Buildings, and such tenement house shall not again be occupied until made to conform in all respects with the provisions of this chapter, notwithstanding the issuance of a building permit for the erection or alteration of such building.

Sec. 445. *Violations—Penalty For.*—Any owner, lessee, tenant, occupant or agent of any tenement house, or any architect, contractor, builder or foreman superintending or in charge of the work of construction of any tenement house violating, disobeying, neglecting or refusing to comply with or resisting the enforcement of any of the provisions of this chapter shall be fined not less than ten dollars nor more than two hundred dollars for each offense, and any violation of any provision of this chapter, if continued after the first fine is imposed, shall, for every week of such continuance, be punishable by an additional fine of not less than ten dollars nor more than two hundred dollars.

Sec. 446. *Provisions of this Chapter not to Apply to Existing Buildings, Except Under Certain Circumstances.*—Nothing in this chapter contained shall be considered as requiring alterations in the construction or equipment of buildings in existence at the time of the passage of this ordinance, and which at the time of their construction were built in compliance with the ordinances then in force, unless such building shall not have sufficient or adequate means of egress therefrom or ingress thereto by reason of insufficient or inadequate stairway or stairways improperly located or insufficient or inadequate elevators or elevator equipment, doors, fire escapes, windows or other means of egress or ingress.

If, however, it is desired to enlarge or in any manner materially modify the construction of any existing building, or to make any change in its use or occupation which will transfer it from one class, as defined by this chapter, to another class, then before such enlargement or structural change or modification of building is made, or before such change in its use or occupation may be made, the entire building shall be reconstructed or modified in such manner as to bring the same, when enlarged or altered, or when occupied for its new and different purposes, into accordance with the provisions of this chapter.

Sec. 447. *Commissioner Shall Notify.*—Where it shall appear to the said Commissioner that any such building has inadequate or insufficient means of egress therefrom or ingress thereto, as aforesaid, he shall notify the owner, agent or person in possession, charge or control of such building, of such fact, and direct him forthwith to make such alterations and changes in the construction or equipment of such building as are necessary to be made in order to promote the safety of the occupants of such building and of persons using the same and of the public.

Sec. 448. *Where Conflicting with Other Sections.*—In cases of direct conflict with the provisions of other sections of this chapter relating to other classes, the provisions of the sections relating to Class VI shall govern in respect to tenement houses.

ARTICLE X.

PROVISIONS RELATING SOLELY TO CLASS VII.

In Class VII shall be included all buildings used for the sale at retail of dry goods and other articles of general merchandise and commonly known and described as "department stores."

Sec. 449. *Buildings of Class VII—Construction Of.*—Buildings used either wholly or in part for the purposes of Class VII three stories or less in height may be of ordinary construction.

Such buildings more than three and not exceeding five stories in height shall be of slow-burning, mill or fireproof construction.

Such buildings over five stories in height shall be of fireproof construction.

Sec. 450. *Walls—Thickness Of.*—The thickness of inclosing walls shall conform to the following requirements:

	STORIES—											
Basement.	1	2	3	4	5	6	7	8	9	10	11	12
One-story	12	12										
Two-story	16	12	12									
Three-story	16	16	12	12								
Four-story	20	20	16	16	12							
Five-story	24	20	20	16	16	16						
Six-story	24	20	20	20	16	16	16					
Seven-story	24	20	20	20	20	16	16	16				
Eight-story	24	24	24	20	20	20	16	16	16			
Nine-story	28	24	24	24	20	20	20	16	16	16		
Ten-story	28	28	28	24	24	24	20	20	16	16		
Eleven-story	28	28	28	24	24	24	20	20	16	16	16	
Twelve-story	32	28	28	28	24	24	24	20	20	16	16	16

Provided, however, in buildings of steel skeleton, fireproof construction thickness of walls shall be governed by Section 510 of this chapter.

Walls, Ledges, Etc.—See Section 588.

Walls Around Stairs, Elevators and Shafts.—See Section 588.

Walls, Reinforced Concrete.—See Section 554.

Sec. 451. *Stories Used for the Retail Sale of Goods—Occupation of Basement—Lockers.*—Not more than the lower twelve stories above the street grade shall be used for the retail sale of goods, or for employes' locker rooms or for manufacturing purposes in a building devoted wholly or in part to purposes of Class VII provided, however, the stories above the twelfth story may be used for these or other purposes when the stairs are built as described in Section 457 of this chapter.

Not more than one floor of any basement or cellar shall be used for the retail sale of goods. Such floor shall be the floor nearest to the inside street grade. Such floor used for the retail sale of goods shall not be more than twenty feet below the inside street grade.

No sub-basement, cellar or part of a basement below such floor shall be used for the sale of any goods in any manner, but locker and dressing rooms may be placed in the sub-basement, provided the space thus occupied be separated from the remainder of the basement by fireproof partitions, and that there be at least two flights of stairs placed as far apart as practicable leading therefrom to the first floor inclosed in fireproof partitions as provided in Sections 533 and 534 of this chapter. Such stairs from such locker or dressing rooms shall be in addition to other stairways required by this chapter in such building, provided that at least one of such stairways shall open directly on a street, alley or court opening on a street or alley or a fireproof passage leading to the street, alley or such court. Where more than five lockers are in one room such lockers shall be of incombustible material.

Sec. 452. *Floor Areas—Maximum.*—The floor area of any one story or portion of a story used for the purposes of Class VII of any building or ordinary construction shall not exceed nine thousand square feet.

The floor area of any one story or portion of a story used for the purposes of Class VII of any building of slow-burning or mill construction shall not exceed twelve thousand square feet.

The floor area of any one story or portion of a story used for the purposes of Class VII of any building of fireproof construction shall not exceed 25,000 square feet.

Sec. 453. *Floor Areas—Exceeding the Maximum Limits Defined in Section 452.*—Where any floor or portion of a floor used for the purposes of Class VII in any building shall exceed in area the maximum number of square feet allowed in the preceding section for the type of construction of such building in which such floor is contained, each such maximum amount of floor area so used shall be separated from other parts of such floor by fire walls or dividing walls built in accordance with the provisions of Section 259 of this chapter relating to dividing walls in buildings of Class I.

Where any such floor so used is divided by such fire walls or dividing walls, each such division of such floor shall be provided with stairs, aisles exits and fire escapes, as is required in this chapter for separate and distinct buildings, and each such division shall be considered as a separate building.

Sec. 454. *Galleries.*—The area of any one or all of the galleries, mezzanine or intermediate floors in any one story used wholly or in part for the purposes of Class VII in any building shall not exceed 10 per centum of the area of such story, and galleries, mezzanine or intermediate floors of a larger size than the above shall be considered as full stories.

Every gallery, mezzanine or intermediate floor shall have at least one stairway not less than three feet wide.

The height from the floor of any gallery, mezzanine or intermediate floor to the ceiling over same shall not be less than seven feet, and there shall be not less than seven feet space between the bottom of such gallery, mezzanine or intermediate floor, and the floor of the story in which such gallery, mezzanine or intermediate floor is placed.

Every gallery, intermediate or mezzanine floor used for the purposes of Class VII in any building shall be built entirely of fireproof or incombustible construction with the exception of the floor surface and nailing strips, which may be of wood.

No gallery, intermediate or mezzanine floor shall be built without a permit from the Department of Buildings, and plans showing the construction and size of such proposed gallery, intermediate or mezzanine floor shall be filed with the Department of Buildings when a permit is applied for.

Sec. 455. *Courts of Class VII Buildings.*—Every court or light shaft of every building used wholly or in part for the purposes of Class VII shall be open and unobstructed from the floor of such court to the sky, with the exception that fire escapes may be built therein, and such court shall have walls constructed in the same manner as is required for the exterior walls of such buildings; provided, that no walls inclosing such courts are required on street or alley lot lines.

All windows, doors or other openings in court walls of such buildings shall have metal frames, metal sashes and metal doors, with the glazed portion thereof of fire-resisting glass.

Sec. 456. *Stories—Numbering Of.*—The first story above the inside street grade shall be designated and known as the first story for all purposes of this chapter, and the stories above shall be numbered, consecutively, the second, third, and so on.

Sec. 457. *Stairways—Interior Stairways in Buildings of Class VII.*—Buildings used wholly or in part for purposes

of Class VII shall have two stairways if the aggregate floor area is five thousand square feet or less, three stairways if the aggregate floor area is more than five thousand square feet and not more than ten thousand square feet, and four stairways if the floor area is more than ten thousand square feet.

The number of stairways and the aggregate width of stairways required for the various floor areas shall be as indicated in the table hereinafter set forth in the following section.

The width of the different stairways need not be alike, and for each four stories, or fractional number of stories, of the building above the first four stories, each stairway may be reduced by six inches, as set forth in the table of stairs in Section 458, but no stair in a Class VII building shall be of a less width than three feet.

Stairways in buildings used wholly or in part for the purposes of Class VII shall be located as far apart as practicable, and shall have hand rails on each side thereof, and no such stairway shall be a spiral stairway or have any winders. The height of the individual riser shall not exceed seven and three-eighths inches. The width of the individual tread shall be not less than ten inches. Stairways which are over seven feet wide shall have double intermediate hand rails with end newel posts at least five and one-half feet high.

The bottom of each stairway shall be in the immediate vicinity of the top of the stairs leading to the next lower story, and the line of travel from stairway to stairway shall be direct and easily accessible each to the other.

Every story below street grade shall have not less than two stairways to the first story and each such stairway shall be not less than three feet wide, but where a basement or cellar is used for the retail sale of goods the stairways from such basement or cellar shall be in number and aggregate width as indicated in the table of stairways set forth in the following section for the lower four stories of the same building.

The whole number of stairways required for any such building shall be complete in every respect from the first floor to the topmost floor, and each stairway shall be extended to the roof.

Provided, however, that if any building used wholly or in part for the purposes of Class VII be equipped with automatic sprinklers, and be connected with another building similarly used, and distant not less than twenty-five feet, and used by the same occupant, by a fireproof bridge or passageway similarly equipped, then each such bridge or passageway shall be held to be equivalent to and take the place of one outside stairway fire escape on each of the buildings so connected.

As amended by ordinance, October 29, 1906.

Sec. 458. TABLE OF STAIRWAYS FOR CLASS VII BUILDINGS.

AGGREGATE WIDTH OF STAIRWAYS.

Bldg. Area	SQUARE FEET OF									
	1st, 2nd, 3rd, 4th, 5th or 8th, Stories	5th, 6th, 7th, 8th, 9th or 12th, Stories	9th, 10th, 11th, 12th, 13th or 16th, Stories	10th, 11th, 12th, 13th or 16th, Stories	13th, 14th, 15th, 16th, 17th or 20th, Stories	14th, 15th, 16th, 17th or 20th, Stories	17th, 18th, 19th or 22nd, Stories	18th, 19th, 20th or 24th, Stories	21st, 22nd, 23rd or 26th, Stories	24th, 25th, 26th or 30th, Stories
25,000	30 feet	27 feet	24 feet	21 feet	17 ft. 6 in.	14 feet	12 feet	10 feet	9 feet	8 feet
20,000	25 feet	22 ft. 6 in.	20 feet	17 ft. 6 in.	14 feet	12 feet	10 feet	9 feet	8 feet	7 feet
15,000	20 feet	18 feet	16 feet	14 feet	12 feet	10 feet	9 feet	8 feet	7 feet	6 feet
14,000	19 feet	17 feet	15 feet	13 feet	11 feet	9 feet	8 feet	7 feet	6 feet	5 feet
13,000	18 feet	16 feet	14 feet	12 feet	10 feet	9 feet	8 feet	7 feet	6 feet	5 feet
12,000	17 feet	15 feet	13 feet	11 feet	9 feet	8 feet	7 feet	6 feet	5 feet	4 feet
11,000	16 feet	14 feet	12 feet	10 feet	9 feet	8 feet	7 feet	6 feet	5 feet	4 feet
10,000	15 feet	13 ft. 6 in.	11 feet	9 feet	8 feet	7 feet	6 feet	5 feet	4 feet	3 feet
9,000	14 feet	12 ft. 6 in.	11 feet	9 feet	8 feet	7 feet	6 feet	5 feet	4 feet	3 feet
8,000	13 feet	11 ft. 6 in.	10 feet	9 feet	8 feet	7 feet	6 feet	5 feet	4 feet	3 feet
7,000	12 feet	10 ft. 6 in.	9 feet	8 feet	7 feet	6 feet	5 feet	4 feet	3 feet	2 feet
6,000	11 feet	9 ft. 6 in.	9 feet	8 feet	7 feet	6 feet	5 feet	4 feet	3 feet	2 feet
5,000	10 feet	9 feet	8 feet	7 feet	6 feet	5 feet	4 feet	3 feet	2 feet	1 foot
4,000	9 feet	8 feet	7 feet	6 feet	5 feet	4 feet	3 feet	2 feet	1 foot	1 foot
3,000	8 feet	7 feet	6 feet	5 feet	4 feet	3 feet	2 feet	1 foot	1 foot	1 foot
2,000 and less	7 feet	6 feet	5 feet	4 feet	3 feet	2 feet	1 foot	1 foot	1 foot	1 foot

Whenever any building of fireproof construction used wholly or in part for the purposes of Class VII shall adjoin or be attached to a fireproof building, used by the same occupant, and having in its required intervening fire wall one or more openings, fitted with fire doors, on each side of the fire wall, having self-closing device thereon, as approved by the Building Department, then every such opening shall, for all purposes, be held to be equivalent to and take the place of and be regarded as a stairway, built and enclosed in the manner described in the following section (459). But in no case shall there be less than one stairway in any such building.

As amended by ordinance, October 29, 1906.

Sec. 459. *Stairs—Fireproof Interior.*—Where an interior stairway and its stair hall of a building used wholly or in part for the purposes of Class VII are inclosed in all stories of the building by fireproof partitions built as described in Section 533 of this chapter for fireproof construction, and where the stairways and landings are built as described in Section 534 of this chapter for fireproof construction, and where the doors, frames, sashes and casings and the glazed portions thereof are built as described in Section 525 of this chapter for fireproof construction, then such stairway, if not less than five feet in width from first floor to the topmost floor, shall be considered as the equivalent of two open stairways, but in no case shall there be less than two stairways in any such building.

Sec. 460. *Stairs—Where Stories Above Twelfth Are Used for Class VII Purposes.*—Where stories above the twelfth story are used for the purposes of Class VII as hereinbefore described for employees' locker rooms, then the stairways from the first to the topmost floor shall be built and inclosed as described in the preceding section, but the stairways shall be in number and in their aggregate width as required in the table of stairways set forth in Section 458 of this chapter.

Sec. 461. *Stairs—Halls—Passageways and Aisles—Signs and Lights.*—The stair halls, passageways or stair aisles shall be unobstructed and shall be as wide as the stairs, and not less than four feet wide in any place in the clear.

The exit door or doors between floors and stair halls shall be as wide as the stairway to which they afford access, and for each elevator opening into such a stair hall the doors to floors shall be increased to two feet in width.

The stairways and stair halls of any building used wholly or in part for the purposes of Class VII shall be illuminated by gas or electric light, and the gas piping and the electric wiring shall be accomplished by piping and circuits separated and distinct from the general illuminating piping and circuits of the premises. Each stair light shall have a red glass inclosure.

At the bottom of each such stairway there shall be an illuminating red glass sign with the number of the story in which it is situated inscribed thereon in letters not less than six inches high.

Sec. 462. *Aisles in Class VII Buildings.*—In buildings used wholly or in part for the purposes of Class VII there shall be aisles in such portions of the building as are used for such purposes, connecting the stairways and the elevators directly with the street or alley doors, and such aisles shall be termed "main aisles." Such main aisles shall have a clear width equal to the width of the stairways connecting therewith, and for each elevator connecting with such an aisle there shall be an additional width of six inches, and no such main aisle shall be less than five feet wide in the clear between the counters in any department store or between the fixed seats therein. One-third the width of any basement stair-

way shall be added to the width of the main aisle connecting with such stairway.

If there is a column in any such aisle, then the width of the aisle shall be increased by the width of such column.

If there is a counter or counters or settee, or any case or other obstruction, in an aisle, then that part of the aisle on each side of such counter, settee or case or other obstruction shall be considered as a separate aisle. No aisle other than a main aisle shall be less than three feet in width.

Sec. 463. *Exit Signs and Lights.*—All exits in buildings used wholly or in part for the purposes of Class VII shall be clearly indicated by illuminated red signs with the word "EXIT" thereon in letters not less than six inches high. At the bottom of each stairway on the street level floor there shall be similar signs indicating the direction of the nearest exit to a street or alley.

Fire escape doors and windows shall be indicated by illuminated red signs with the words "FIRE ESCAPE" thereon in letters not less than six inches high.

Sec. 464. *Doors at Street Level—Revolving Doors.*—The clear width of the exit openings shall be computed in the same manner as that provided in this article for main aisles, and no door openings shall be less than five feet wide, and all doors shall swing outward. Revolving doors shall not be considered as exits, unless the revolving wings of said revolving doors are so arranged that by the application of a force slightly more than necessary to revolve said doors and which one person of ordinary strength is capable of exerting, all the wings of said doors fold flat on each other and in an outward direction, and unless each side, or the half circles of such revolving doors, are hinged and fastened so as to likewise swing backwards on application of force slightly beyond the normal, and which will permit of exit space for two ordinary persons on either side of the collapsed wings of said revolving doors and their inclosing half circles.

As amended by ordinance March 30, 1906.

Sec. 465. *Doors in Dividing Walls.*—Door openings may be built in dividing walls of such buildings, provided, however, that such door openings shall be provided with fireproof doors built as described in Section 260 of this chapter, and that each door shall have an efficient closing device, automatic in operation in the event of a fire, in close proximity to such door and on each side of such opening.

Each such opening shall have exit signs and lights as provided for street doors and exits in Section 463 of this chapter. There shall be aisles not less than five feet in width connecting with such doors from the main aisles, and in no case shall any such door be of less width than the aisle directly connecting therewith.

Doors and Windows—When Required to Be Closed—Fire Resisting Glass.—See Section 632.

Sec. 466. *Floors—Strength Of—Allowance for Live Loads.*—Every structural part of every building used wholly or in part for the purposes of Class VII shall safely support, in addition to the weight of floor construction, partitions and permanent mechanisms that may be set upon the same, a live load of not less than one hundred pounds per square foot of floor area, and the construction shall be calculated according to the safe unit stresses elsewhere defined in this chapter. Every part of any such building which is subjected to a live load of more than one hundred pounds per square foot of floor shall be of sufficient strength in the parts which support such load to safely support the load imposed, calculated according to the safe allowable unit stresses elsewhere defined in this chapter.

Sec. 467. *Fire Escapes in Class VII Buildings.*—Every such building more than two stories in height shall have two stairway fire escapes. Such stairway fire escapes shall each be not less than thirty-six inches wide between centers of hand rails. Such stairway fire escapes shall be at opposite ends of the building or as far apart from each other as practicable.

Sec. 468. *Passageways—Fireproof.*—Where stairway fire escapes do not extend to the ground level they shall have a counterbalanced stairway to the ground from a platform not more than twenty feet above the ground level.

Fire escapes in inclosed courts shall have open, unobstructed fireproof passageways leading directly to a street or an alley.

Sec. 469. *Fire Escapes—Windows and Railings On—Doors Opening On.*—All windows and doors which are passed by a fire escape of any kind, and all windows and doors opening on fire escape platforms or landing shall have fireproof frames glazed with fire-resisting glass.

Each fire escape platform shall have at least one window on each floor in any such building opening thereon.

Each such window shall be indicated by signs and lights as required in Section 463 of this chapter for exits.

Where window sills at fire escape exits are more than two feet above the floor, one or more steps not less than three feet wide shall be provided, with risers not to exceed twelve inches high and treads not less than eight inches wide.

The railings on stairway fire escapes and the railings around fire escape platforms shall have iron guards in addition to the iron hand rails; such guards shall be not less than four feet high measuring from the outer corner of the tread or from the platform; such guards shall have a mesh or openings not over two and one-half inches square, and the metal strands in such guards shall have a cross section of not less than one-eighth of an inch in diameter.

Sec. 470. *Fire Drill of Employees.*—It shall be the duty of every person or corporation maintaining or in possession, charge or control of any building used wholly or in part for the purposes of Class VII to designate certain adult male employees in such building (the number of which employees shall be prescribed by the Fire Marshal), who shall be regularly and throughout the entire time such building is open to the public employed in such building, and who shall be physically and mentally able to perform the duties which shall be required of them in case of fire occurring in any such building. Such employees shall at least once in each month, when directed by the Fire Marshal or any authorized member of the Fire Department, take part in a fire drill conducted by the Fire Marshal, or any authorized member of the Fire Department, in the use of all apparatus for the prevention and extinguishing of fire in such building, whenever the Fire Marshal shall deem such drill necessary or advisable. Such person or corporation shall pay to the city the proportion of the regular salary of any employee of the Fire Department who shall be employed in drilling and examining the employees of any such building, based upon the time of such employment, and the Fire Marshal shall render bills monthly for such services.

Sec. 471. *Standpipes—Pumps—Axes, Etc.*—Amended by ordinance of July 8, 1907, to read as follows (Superseding amendatory ordinance of March 19, 1906):

(1) In every building over one hundred (100) feet in height not provided with three (3) inch or larger inside standpipe, in all buildings hereafter constructed of a greater height than seventy-five (75) feet (except buildings used for

theater purposes, as herein elsewhere provided for); in all buildings used for hospital purposes of a greater height than three (3) stories, with accommodations for at least twenty (20) patients; and in all buildings of a greater height than five (5) stories now or hereafter used for hotel or public lodging house purposes there shall be constructed one (1) or more four (4) inch standpipes, which shall extend from basement to roof and which shall be connected at street or alley side of building with two-way Siamese connection for use of Fire Department, and which shall be provided with one hose connection, with Fire Department thread, on the roof of said building, on each floor and in the basement thereof, with sufficient hose attached to reach any point thereof. The pattern, quality, installation and maintenance of such standpipe, hose and couplings, shall be subject to the approval of the Fire Marshal.

(2) In any of the buildings herein referred to where approved sprinkler systems are installed and properly maintained, it shall not be necessary to install additional inside standpipe as above provided for.

(3) On each floor and in the basement of every building used for hotel, public lodging, or school purposes, three or more stories in height, there shall be two (2) or more portable hand pumps or chemical extinguishers, one or more fire axes and one or more pike poles. In the basement or janitor quarters of all apartment buildings three or more stories in height, the floors of which are divided into two or more apartments, and in the basement of all office buildings four or more stories in height there shall be provided one or more portable hand pumps or chemical extinguishers, one or more fire axes and one or more pike poles; all of which shall be installed and maintained subject to the approval and supervision of the Fire Marshal.

(4) The interior of all grain elevators and malt houses of a height of fifty (50) or more feet, which are not entirely fireproof, and which have a capacity of two hundred and fifty thousand (250,000) bushels or over, and the interior of all cold storage houses of a height of four (4) or more stories, which are not entirely fireproof and which have a ground floor area of ten thousand (10,000) or more square feet, shall be equipped with either a dry or wet sprinkler system, to each of which systems there shall be a feeder or riser pipe or pipes not less than four (4) inches in diameter, leading from one or more Siamese steamer connections; all of which shall be installed and maintained subject to the approval of the Fire Marshal.

(5) Grain elevators which are equipped with Journal Fire Alarm Systems of the most approved pattern and which are left at all times in the most perfect working order, or grain elevators, malt houses and cold storage houses, which are now equipped with standpipes, of approved pattern and hose with not less than two (2) inch connections which have been installed in accordance with City ordinances and approved by the Fire Department, each floor of which is approved by said department as being at all times easily accessible to firemen, where fire extinguishers, water barrels and pails are distributed at intervals on all floors on advice and instruction of the Chicago Underwriters' Association; where the necessary pump pressures is maintained; where some approved electric watch service and fire alarm system is maintained and watchmen are employed during nights, Sundays and holidays, pulling such stations not less frequently than once per hour, and which have outside Siamese connections and standpipes not less than two and one-half (2½) inches, shall be exempt from the provisions of this ordinance.

ARTICLE XI.

PROVISIONS RELATING SOLELY TO CLASS VIII.

In Class VIII shall be included every building used exclusively for school purposes.

Sec. 472. *Buildings of Class VIII—Construction Of.*—All buildings used wholly for the purposes of Class VIII hereafter erected shall be constructed in accordance with the provisions of this chapter relating to Class VIII as follows, viz.:

Such buildings having a seating capacity of less than four hundred, or which are not over two stories and basement in height, may be built of ordinary construction.

Such buildings having a greater seating capacity than four hundred and less than eight hundred, or which are not over three stories and basement in height, shall be built of slow-burning or fireproof construction.

Such buildings having a greater seating capacity than eight hundred, and which are more than three stories and basement in height, shall be built entirely of fireproof construction.

New additions to existing buildings may be built; provided, however, that such new additions shall comply with the above requirements.

All alterations in existing buildings used wholly for the purposes of Class VIII other than new additions thereto, intended to make them comply with the requirements of this chapter, may be executed in the same kinds of materials of construction at present employed in such buildings, unless otherwise distinctly provided herein.

Sec. 473. *Frame Buildings—Portable.*—Portable frame buildings used wholly for the purposes of Class VIII not larger than twenty-eight feet by thirty-six feet, and not over one story high, may be erected, provided the exterior walls and roof of same are covered with metal or incombustible material, and the interior woodwork painted with fireproof paint, approved by the Commissioner of Buildings. And provided, further, that the location of such buildings shall be approved by the Commissioner of Buildings. Such portable buildings shall not be located nearer than ten feet to any other building, and shall not be maintained on any one lot or block for a longer period than two years after the date of the issuance of the permit therefor without a new permit from the Commissioner of Buildings.

Doors and Windows—When Required to Be Closed—Fire-Resisting Glass.—See Section 632.

Sec. 474. *Walls—Window Openings In.*—No wall of any building used wholly for the purposes of Class VIII containing a window opening shall be nearer than five feet to any lot line of adjoining property (street and alley lines not included).

Sec. 475. *Walls—Thickness Of.*—The following regulations shall govern the construction of buildings used wholly for the purposes of Class VIII:

The thickness of surrounding walls and of all dividing walls carrying the load of floors or roof shall be as indicated in the following table, to-wit:

Walls Around Stairs, Elevators and Shafts.—See Section 588.

	—STORIES—				
	Basement.	1	2	3	4 5
		in.	in.	in.	in. in.
One story	16	12			
Two stories	16	16	12		
Three stories	16	16	16	12	
Four stories	20	20	16	16	12
Five stories	24	20	20	16	16 16

Buildings built of fireproof construction shall be excepted from the foregoing provisions of this section, but shall comply with the other provisions of this chapter governing such buildings.

Sec. 476. *Loads—Live.*—The floors of buildings used wholly for the purposes of Class VIII shall be designed and constructed so as to be capable of bearing in all their parts, in addition to the weight of floor construction, partitions, permanent fixtures and mechanisms that may be set upon same, a live load of seventy-five pounds per square foot.

Sec. 477. *Stories—Height Of.*—No story above the basement shall be less than twelve feet in height in the clear.

Sec. 478. *Floor Levels in Buildings of Fireproof Construction.*—The following limitations of floor levels of auditoriums or assembly halls of such buildings shall be observed in all cases:

In buildings of fireproof construction.

Not to exceed one thousand seating capacity, not over ten feet above sidewalk level.

Not to exceed one thousand seating capacity, not over thirty feet above sidewalk level.

Not to exceed eight hundred seating capacity, not over fifty feet above sidewalk level.

Not to exceed five hundred seating capacity, in any story provided, however, that there shall be at least two separate and distinct stairways from the floor in which such auditorium or assembly hall is located to the ground, each of which shall not be less than four feet wide in the clear.

Sec. 479. *Floor Levels—In Buildings Having Stairs and Corridors of Fireproof Construction.*

Not to exceed one thousand five hundred seating capacity, not over ten feet above sidewalk level.

Not to exceed one thousand seating capacity, not over twenty-five feet above sidewalk level.

Not to exceed eight hundred seating capacity, not over forty-two feet above sidewalk level.

Not to exceed five hundred seating capacity, not over fifty feet above sidewalk level.

Not to exceed two hundred and fifty seating capacity, not over sixty feet above sidewalk level.

Sec. 480. *Floor Levels in Buildings of Mill, Slow-Burning or Ordinary Construction.*

Not to exceed one thousand seating capacity, not over ten feet above sidewalk level.

Not to exceed six hundred and fifty seating capacity, not over thirty feet above sidewalk level.

Not to exceed five hundred seating capacity, not over forty-five feet above sidewalk level.

Not to exceed two hundred seating capacity, not over sixty feet above sidewalk level.

Sec. 481. *Floors—Height Of, Measured from Sidewalk Level.*—Heights shall be measured from sidewalk level at entrance of buildings to highest part of main floor of auditorium or assembly hall.

Sec. 482. *Stairways—Width Of.*—Stairways in buildings used wholly for the purposes of Class VIII shall be in width equivalent to fifteen inches for every hundred of seating capacity in such building, as measured by the aggregate seating capacity of the auditorium, assembly rooms and school rooms; provided, however, that the number of persons allowed in such buildings at any one time shall be limited by the width of stairways available as exits therefrom.

No stairway shall be less than four feet in the clear, except where more than two stairways lead down from any floor,

in which case stairways three feet wide in the clear may be counted in the total width of stairways required.

Where two or more stairways are used, they shall be placed at opposite ends of the building, or as far apart as practicable, and all such buildings hereafter erected shall have at least two separate and distinct stairways from the ground floor to the top floor, and all existing buildings shall have two such separate and distinct stairways, or one stairway and one stair or sliding fire escape.

Sec. 483. *Stairways—Railings on Each Side—Height of Landing.*—All stairways shall have railings on each side thereof. No stairway shall ascend a greater height than thirteen feet six inches without a level landing, which, if its width is in the direction of the run of the stairs, shall be not less than four feet wide, or which, if at a turn of the stairs, shall be of not less width than the stairs, and no winder shall be permitted in any stairs.

Sec. 484. *Stairways—Fireproof.*—In such buildings hereafter erected more than two stories and basement in height, the stairways and their enclosing walls shall be of fireproof construction.

Sec. 485. *Corridors, Passageways, Hallways and Doors—Width Of.*—The width of corridors, passageways, hallways and doors shall be computed in the same manner as that herein provided for stairways; provided, however, that no corridor shall be anywhere less than five feet in width, and no door less than three feet in width, except where two or more doors, each two feet four inches or more in width, are grouped together.

Sec. 486. *Doors to Open Outward.*—All doors in such buildings shall open outward, and all entrance and exit doors shall be unlocked at all times when the building is occupied for school purposes, or open to the public.

Sec. 487. *Doors—Exits Covered with Metal.*—All exit doors from assembly halls and class rooms to other parts of the building shall be covered with metal or other fireproof material, approved by the commissioner of buildings.

Sec. 488. *Aisles—Width Of—Number of Seats in Auditorium.*—Aisles in auditoriums and assembly halls in such buildings shall be in width equivalent to eighteen inches for every one hundred of seating capacity in such auditorium or assembly hall, but no such aisle shall be less than two feet six inches wide in its narrowest part. All groups of seats shall be so arranged that they shall have an aisle on each side, and not more than twelve seats in any one row shall be placed between aisles.

Sec. 489. *Aisles in Class and Recitation Rooms.*—Aisles in class rooms, recitation rooms and study rooms of such buildings shall be in width equivalent to eighteen inches for every one hundred permanent seats in any such room, but no main or cross aisle shall be less than two feet six inches wide in its narrowest part.

Sec. 490. *Aisles and Passageways—Kept Clear of Obstructions.*—All aisles and passageways in such buildings shall be kept free from camp stools, chairs, sofas and other obstructions, and no person shall be allowed to stand in or occupy any of such aisles or passageways during any performance, service, exhibition, lecture, concert or any public assembly, nor shall there be any chairs, settees or camp stools in such aisles or corridors at such times or occasions.

Sec. 491. *Emergency Exits for Auditoriums or Assembly Rooms—Aggregate Width Of.*—All auditoriums or assembly halls of such buildings having a seating capacity of eight

hundred or more shall be provided with emergency exits. The aggregate width of such emergency exits which shall be provided for each floor, balcony or gallery of such auditorium or assembly hall shall be one-half of the width of the main exit. No emergency exit or stairway shall be less than three feet in width.

Sec. 492. *Exits—Signs.*—All exits opening from auditoriums and assembly halls of such buildings shall have the word "EXIT," in letters at least six inches high, applied to the auditorium side of every such exit, and when such auditorium or assembly hall is used at night, a red light shall be kept burning over the word "EXIT" during the entire time such building is so used and until the pupils or audience have left the building.

Sec. 493. *Lights in Buildings.*—Every portion of any such building devoted to the uses or accommodation of the public and all outlets therefrom leading to the streets, including the open courts and corridors, stairways and exits, shall be well and properly lighted during the entire time such portion is in use, and shall remain lighted until all the pupils or the audience have left the premises. All gas or electric lights in the halls, corridors, lobbies, stairs and exits leading from the auditorium or assembly halls shall be controlled by a separate shut-off and shall be independent of all other lights in such building.

Sec. 494. *Windows.*—The total glass area of outside windows and skylights of each class room, recitation room or study room in such buildings shall be not less than one-ninth of the floor area of such room.

Sec. 495. *Basement.*—In every such building in which the lower or basement floor is below the surface of the ground surrounding such building, and is used in part or as a whole for heating or ventilating apparatus, such floor shall be considered the basement story of such building. Permanent class rooms in basement shall not be permitted.

Sec. 496. *Fire Escapes.*—Every building used for the purposes of Class VIII of four or more stories in height shall be provided and equipped with one or more stairways or sliding fire escapes in such locations and numbers as shall be satisfactory to the Commissioner of Buildings.

Sec. 497. *Fire Escapes to Be Examined.*—It shall be the duty of the janitor of every such building, or such other employe or employes thereof as may be directed by the principal of such school to examine all fire escapes of such buildings from the topmost story to the ground, and to examine and operate all doors, windows and platforms leading to and from such fire escapes; and such inspection shall be made at least once each and every week that such building is used for school purposes, and a written report made of such inspection to the principal of such school, showing the time it was made and the condition of the fire escapes.

Such fire escapes shall be kept in good condition ready for immediate use at any and all times that such building is in use, and shall be kept free of snow and ice.

Sec. 498. *Fire Drill.*—The principal or other person in charge of the pupils in every such building shall establish and maintain a good and efficient fire drill, which shall be practiced at least twice every month during the time such building is used for school purposes.

A record shall be kept by the principal or other person in charge of the pupils of each fire drill held and of the time that elapses from the first fire signal until the last person is out of the building.

Walls—Around Stairs, Elevators and Shafts.—See Section 588.

ARTICLE XII.

GENERAL PROVISIONS.

FIREPROOF CONSTRUCTION.

Sec. 499. *Fireproof Construction.*—In cases in which it is claimed that any equally good or more desirable mode or manner of construction, or material, or device for fireproofing, other than specified in this chapter, can be used in the erection or alteration of buildings, the Commissioner of Buildings, upon written application to him for a permit to use the same, shall have power to appoint a Board of Examiners, consisting of not less than three nor more than five members, each of whom shall have had at least ten years' experience in Chicago as an architect, engineer or builder, who shall take the usual oath of office. The said examiners shall adopt rules and specifications for examining and testing such mode or manner of construction, or material or device for fireproofing, and furnish a copy of the same to the applicant. And such specification shall provide for a comparative fire test of not less than four hours and for a period of at least two hours an average temperature of 2,000 degrees Fahrenheit shall be maintained. At the end of this test water shall be applied to the construction through a 1½-inch nozzle under 60 pounds pressure for five minutes. Hollow tile shall be used as a basis for comparison, and if the proposed material shall pass said test as well or better than hollow tile, it shall be approved as a fireproofing material. The said examiners shall thereupon notify such applicant to submit to such examination and make such tests in the presence of the said examiners, or a majority thereof, according to such rules and specifications. All expenses of such examiners, and of such examinations and tests, shall be paid by the applicant, and said examiners may require security therefor.

The said examiners shall, after such examination and tests, certify the results and their decision on the said application to the Commissioner of Buildings, who shall have power, in the event of the examination and tests being satisfactory, to grant a permit to the applicant in accordance with such decision of the said Board of Examiners.

A complete record of the proceedings and all acts and decisions of the said Board of Examiners shall be kept by the Commissioner of Buildings in his office.

The Commissioner of Buildings shall have the power to pass upon any question relative to the mode or manner of construction or materials to be used for fireproofing in the erection or alteration of any building or structure to make the same conform to the true intent and meaning of the several provisions of this chapter.

Sec. 500. *Fireproof Construction—Definition Of.*—The term fireproof construction shall apply to all buildings in which all parts that carry weights or resist strains, and also all exterior walls and all interior walls and all interior partitions and all stairways and all elevator enclosures are made entirely of incombustible material, and in which all metallic structural members are protected against the effects of fire by coverings of a material which shall be entirely incombustible, and a slow heat conductor, and hereinafter termed "fireproof material." Reinforced concrete as defined in this ordinance shall be considered fireproof construction.

Sec. 501. *Fireproof Material.*—The materials which shall be considered as filling the conditions of fireproof covering are: First, burnt brick; second, tiles of burnt clay; third, approved cement concrete; fourth, terra cotta; fifth, approved cinder concrete.

Sec. 502. *Concrete—Approved Cement.*—All approved cement concrete shall consist of a standard Portland cement, torpedo sand and crushed stone or gravel, or crushed blast furnace slag, or crushed burnt clay, the volumetric quantity of any one of these materials combined with the torpedo sand shall not exceed nine times the volume of the Portland cement. All of the ingredients of cement concrete shall be thoroughly worked and wet so as to cover each piece of stone or gravel or slag or burnt clay with moistened cement; and the cement and sand shall fill the voids between the coarse material of the cement concrete.

Cement concrete to be considered a fireproof material shall be cast and rammed in an unset condition against the metal.

Sec. 503. *Machine or Hand Pressed Concrete.*—Machine or hand pressed concrete bricks or blocks are not considered in this chapter as a fireproof material for the protection of metallic structural members.

Sec. 504. *Brick, Burnt Clay, Tiles, Etc.—How Applied.*—Brick, burnt clay, hollow tiles, porous clay, solid tiles and terra cotta shall be applied to the metal in a bed of mortar.

Sec. 505. *Fireproof Covering—Minimum Thickness Of.*—The minimum thickness of fireproof covering on any metal shall be, if of hollow tile, constructed in such a manner that there shall be not less than one air space of at least three-fourths of an inch, by the width of the metal surface to be covered, within the clay covering; if of porous clay tiles, the covering shall be at least one and one-half inches thick. The minimum thickness of concrete covering any metal shall be two inches.

Sec. 506. *Incombustible Materials.*—A metal or fire-resisting glass of not less than one-quarter inch in thickness, or plastering, or plaster blocks, or stone or granite, or marble, or an improved cinder concrete, or one of the fireproof materials described herein shall be considered an incombustible material as called for by this chapter.

Sec. 507. *Concrete—Cinder—Floor Filling—Specifications For.*—Whenever the use of a cinder concrete is permitted by this chapter, such cinder concrete shall be composed of the following named ingredients, in the proportion here described, to-wit: Five parts of clean, thoroughly burnt steam boiler cinders, no particle of which shall be larger than one (1) inch; three parts of clean grit sand, or of clean stone screenings, and one part of a Standard Portland cement; the working and wetting of these ingredients shall be done in the same manner as required for cement concrete in Section 502 of this chapter, and such a mixture of approved cinder concrete may be used only for floor filling.

Sec. 508. *Fireproof Covering—Measurements.*—In every case the thickness of the covering specified in this chapter shall be measured from the extreme projection of the metal, unless otherwise provided herein.

Sec. 509. *Skeleton Construction.*—The term "skeleton construction" shall apply to all buildings wherein all external and internal loads and strains are transmitted from the top of the building to the foundations by a skeleton or framework or metal. In such metal framework the beams and girders shall be riveted to each other at their respective junction points. If columns made of rolled iron or steel are used, their different parts shall be riveted to each other, and the beams and girders resting upon them shall have riveted connections to unite them with the columns. If cast iron columns are used, each successive column shall be bolted to

the one below it by at least four bolts not less than three-fourths of an inch in diameter, and the beams and girders shall be bolted to the columns. At each line of floor or roof beams, lateral connections between the ends of the beams and girders shall be made in such manner as to rigidly connect the beams and girders with each other in the direction of their length.

Sec. 510. *Walls—Enclosing.*—If buildings are made fireproof entirely, and have skeleton construction so designed that their enclosing walls do not carry the weight of floors or roof, then their walls shall be not less than twelve inches in thickness; provided, such walls shall be thoroughly anchored to the iron skeleton, and whenever the weight of such walls rests upon beams or columns, such beams or columns shall be made strong enough in each story to carry the weight of wall resting upon them without reliance upon the walls below them. All walls shall be of fireproof or incombustible material.

Sec. 511. *Columns—Exterior.*—All iron or steel used as a vertical supporting member of the external construction of any building exceeding sixty feet in height shall be protected as against the effects of external changes of temperature, and of fire, by a covering of fireproof material consisting of at least four inches of brick, or of four inches of concrete, or of four inches of burnt clay tiles, or of four inches of hollow terra cotta, or of a combination of any two of these materials, provided that their combined thickness is not less than four inches. The thickness of four inches shall be measured from the extreme projections of the metal of the column proper.

Where stone or other incombustible material is used for the exterior facing of a building, the distance between the back of the facing and the extreme projections of the metal of the column proper shall be at least four inches, and this four-inch space shall be filled with one of the fireproof materials.

In all cases, the brick or burnt clay, tile or terra cotta, if used as a fireproof covering, shall be bedded in cement mortar close up to the iron or steel members, and all joints shall be made full and solid.

Sec. 512. *Fireproofing of Exterior Sides of Mullions.*—In buildings required by this chapter to be of fireproof construction, all vertical door or window mullions over eight inches wide shall be faced with incombustible material; horizontal transom bars over six inches wide shall be faced with a fireproof or with an incombustible material.

Sec. 513. *Spandril Beams, Girders, Lintel.*—The metal of the spandril beams or spandril girders, or lintels of exterior walls, which support a part of exterior walls, shall be covered in the same manner, and with the same material, as specified for the exterior columns in this chapter. The covering thickness shall be measured from the extreme projection of the metal in every case.

Sec. 514. *Fireproof Covering Independent.*—All covering of brick, concrete, burnt clay tiles, hollow terra cotta or of a combination of any two of these materials shall be applied to all of the structural members of the exterior of a fireproof building previously and independently of the application of the architectural facing of such fireproof building with an incombustible or fireproof material.

Sec. 515. *Iron or Steel Plates for Support of Wall.*—If iron or steel plates or angles are used in each story for the support of the facings of the walls within such story, such plates or angles shall be of sufficient strength to carry

the weight within the limits of fiber stress for iron and steel elsewhere specified in this chapter, the enveloping material for such story, and such plates or angles may extend to within two inches of the exterior of such covering.

Sec. 516. *Walls, Support and Fireproofing Of.*—Where skeleton construction is used for the whole or part of a building, the enveloping material and the walls shall be independently supported on the skeleton frame for each individual story.

Sec. 517. *Terra Cotta.*—If terra cotta or other hollow blocks are used, as fireproof covering, they shall be backed up with brick or hollow tile or concrete; whichever is used shall be, however, of such dimensions and laid up in such a manner that the backing will be built into the cavities of the facing so as to secure perfect bond between the facing and its backing.

Sec. 518. *Coping.*—The upper surfaces of all breaks or offsets in external coverings and fillings and walls, as well as the tops of walls, shall be covered with stone, terra cotta, metal, concrete or fire clay copings set in cement mortar. Copings of all kinds which do not have lapped joints shall be pointed with mortar composed of one part of standard Portland cement and two parts of torpedo sand.

Sec. 519. *Columns—Interior.*—The covering of interior columns shall be one or more of the fireproof materials herein described.

If such covering shall be of brick or concrete it shall be not less than four inches thick; if of burnt clay tiles such covering shall be in two consecutive layers, each not less than two and one-half inches thick, with one air space; if of porous clay solid tiles it shall consist of at least two layers not less than two inches thick each, or if constituted of a combination of any two of these materials, one-half of the total thickness required for each of the materials shall be applied, of each of such materials. Whether hollow tile, porous tile or terra cotta is used, the two consecutive layers shall be so applied that neither the vertical nor the horizontal joints in the same shall be opposite each other, and each course shall be so anchored and bonded within itself as to form an independent and stable structure.

In all cases, the brick or hollow tile, solid tiles or terra cotta shall be bedded in cement mortar close up to the iron or steel member, and all joints shall be made full and solid.

In the case of columns having an "H" shaped cross section or of columns having any other cross section, with channels or chases open from base plates to cap plates on one or more sides of the columns, then the thickness of the fireproof covering may be reduced to three inches, measuring in the direction in which the flange or flanges project, and provided that the thin edge in the projecting flange or arms of the cross sections does not exceed three-quarters of an inch in thickness. The thickness of the fireproof covering on all surfaces measuring more than three-quarters of an inch wide and measuring in a direction perpendicular to such surfaces shall be not less than that specified for interior columns in the beginning of this section, and all spaces, including channels or chases between the fireproof covering and the metal of the column, shall be filled with a solid fireproof material. Lattice or other open columns shall be completely filled with approved cement concrete.

Sec. 520. *Foundations—Steel In—Concrete Around Bottom of Columns.*—If steel or iron in any form is used as part of a foundation, it shall be thoroughly imbedded in a concrete,

the ingredients of which shall be such that, after proper ramming, the interior of the mass will be free from cavities. The steel or iron shall be entirely enveloped in approved cement concrete, and around the exposed external metal surfaces of such foundation there shall be a covering of approved cement concrete not less than four inches thick.

After the bases or base plates and columns have been set in place, both shall be protected from the effects of moisture by a covering of approved cement concrete applied direct to the metal in an unset state, measuring not less than two and one-half inches thick from the extreme projection of the metal, filled solid into all spaces, and forming a continuous concrete mass from the grillage or other foundations to an elevation six feet above the floor level nearest the column base plate or column stool.

Sec. 521. *Columns—Wiring Clay Tiles On.*—Burnt clay tile column covering shall be secured by winding wire around the columns after the tile has all been set around such columns. The wire shall be securely wound around the tile in such manner that every tile is crossed at least once by a wire. If iron wire is used it shall be galvanized, and no wire used shall be less than No. 12 gauge.

Sec. 522. *Fireproofing—Protective Covering For.*—In places where there is trucking or wheeling or other handling of packages of any kind, the lower five feet of the fireproofing of such columns shall be encased in a protective covering either of iron or oak plank, which covering shall be kept continually in good repair.

Sec. 523. *Pipes Inclosed by Covering.*—Pipes shall not be inclosed in the fireproofing of columns or in the fireproofing of other structural members of any fireproof building, provided, however, gas or electric light conduits not exceeding one inch inside diameter may be inserted in the outer two inches of the fireproof of such structural member.

Sec. 524. *Shafts, Etc.*—In cases where a pipe, conduit, dumb waiter, cable, wire, conveyor, belt or any combination thereof passes from one story to another story through an open hatch or floor opening, a shaft or enclosure of fireproof material shall be built from floor to floor around such hatch or floor opening, in each story above and below such hatch or floor opening in the same manner as described for fireproof partitions in this chapter. The area of space thus inclosed shall not exceed the area of the hatch or floor opening by more than one hundred per centum.

In no case shall any wood be used in the construction or support or fittings of such shaft as described above. If such holes in floors as described above in this section are not enclosed by such fireproof enclosures, then the open spaces in each floor opening not occupied by pipes, conduits, cables, wires, conveyors, belts or any combination thereof, shall be filled solid with fireproof material not less than eight inches thick.

Sec. 525. *Shafts, Partitions Around, Plastering of Shafts, Doors and Windows.*—All burnt clay or terra cotta partitions or walls around shafts having openings in floors shall be plastered on the outside and plastered or pointed on the inside.

All doors, frames, sashes, casings and windows in partitions or walls around floor openings, or around stair shafts or elevator shafts, shall be built of incombustible material. The supports of such doors, frames, sashes, casings and windows shall also be of incombustible material; in the case of doors, such supports shall be of rolled structural metal extending from floor to ceiling and secured to both. Where

there are brick walls of twelve inches or more in thickness, the supports need not extend to ceiling as above specified. All glass used in connection with such partitions or walls shall be fire resisting.

Sheet metal work pressed over asbestos paper and wood may be used for the doors, frames, sashes and casings, and for openings in such partitions, except for elevator doors in shafts and where the provisions of this chapter require all metal doors.

Sec. 526. *Beams and Girders, Coverings Of.*—The beams and girders of the interior structural parts of a building shall be covered by one of the fireproof materials, so applied as to be supported entirely by the beam or girder protected, and shall be held in place by the support of the flanges of such beams or girders and by the cement mortar used in setting. If metal binding or metal anchors are used as fastenings of such fireproof covering, such metal binding or such metal anchor shall be protected by not less than one-half inch of fireproof covering.

If the covering is of brick it shall be not less than four inches thick; if of hollow tiles or if of solid porous tiles, or if of terra cotta, each of such tiles shall be not less than one and one-half inches thick, applied to the metal in a bed of cement mortar; hollow tiles shall be constructed in such a manner that there shall be one air space of at least three-fourths of an inch by the width of the metal surface to be covered within such clay coverings; the minimum thickness of concrete on the bottom and sides of metal shall be two inches.

The top of all girders and beams shall be protected with two inches of brick or one and one-fourth inches of burnt clay, or two inches of approved cement concrete, or three inches of approved cinder concrete. The brick or burnt clay shall be bedded solid on the metal in cement mortar.

In all cases of beams or girders, in roofs or floors, no matter what the material or form of the floor arch used, the protection of the bottom flanges of the beams and girders and so much of the web of the same as is not covered by the arches shall be made as hereinbefore specified for the covering of beams and girders. In every case the thickness of the covering shall be measured from the extreme projection of the metal, and the entire space or spaces between the covering and the metal shall be filled solid with one of the fireproof materials excepting the air spaces in hollow tile.

Sec. 527. *Girders and Trusses.*—All girders or trusses, when supporting loads from more than one story, shall be fireproofed with two thicknesses of fireproof material or a combination of two fireproof materials, as required for exterior columns in Section 511 of this chapter, and each covering of fireproof material shall be bedded solid in cement mortar.

All other girders or trusses supporting only a ceiling or roof shall be covered with a fireproof covering as specified for beams and girders in Section 526 of this chapter.

Sec. 528. *Cut-Out Boxes, Chases, Etc.*—No electric service cut-out box, switch box, cabinet, chase or any other recess, shall encroach on the minimum thickness required for any fireproof covering on structural metal, except as provided in Section 523 of this chapter. If the depth of any cut-out box, switch box, cabinet, or chase, or of any other recess, is to be concealed or partially concealed, then the thickness of the fireproof covering shall be increased correspondingly.

Sec. 529. *Floor, Construction Of—Hollow Tile Flooring.*—Brick, hollow tile, porous terra cotta, or approved cement concrete, or approved cinder concrete, shall be used for the

construction of floors and roofs of fireproof buildings. Flat arch hollow tile, or flat arch porous clay tile floor arches shall have a height of at least one and one-half inch for each foot of span.

Hollow tile flat arch floor construction having a thickness of only one and one-half inch for each foot of span shall be used only for the minimum floor loads, and the area of burnt clay in the flanges and ribs, and webs of the hollow burnt clay tiles shall be proportioned to the safe value of resistance to compression of the materials used in the most stressed areas of the burnt clay.

Sec. 530. *Segmental Arches.*—Segmental arches shall have a rise of at least one inch for each foot of span of arch.

The least thickness of a hollow tile or porous terra cotta segmental arch shall be one-half of an inch per foot of span, but no such hollow tile or terra cotta arch shall be of a thickness less than five inches.

Both flat and segmental arches shall be so constructed that the joints of the same radiate from a common center and there shall be a cross rib for every four inches, or fractional part thereof, in height in each tile block. The skew back of the arches shall be carefully fitted to the beams supporting them, and in addition to the cross ribs there shall also be additional diagonal reinforcing ribs in the skew back. Such arches, whether flat or curved, shall have their beds well filled with cement mortar, and the centers shall not be struck until the mortar has set.

Burnt clay skew backs shall be molded in such a manner as to support the burnt clay covering on the under sides of beams or girders.

Sec. 531. *Floors, Wood Surfacing and Nailing Strips.*—Wood floor surfacing and wooden nailing strips for such wood floor surfacing may be used in fireproof buildings.

Where wood flooring is used in a fireproof building, the space immediately under such wood flooring, and between the wood nailing strips and under such wood nailing strips, shall be filled with a cement or a cinder concrete tamped into place in an unset state, or such other incombustible material as shall be approved by the Commissioner of Buildings.

Sec. 532. *Partitions in Fireproof Buildings.*—The partitions around stairs, stair halls, shafts, elevators or public lavatories shall be fireproof partitions, as described in Section 533 of this chapter; all other partitions in fireproof buildings shall be incombustible partitions. Where blocks are used for building partitions or as enclosing walls the joints shall be well filled with mortar.

The partitions shall be wedged tight between floors and ceilings with incombustible wedges.

* Sec. 533. *Partitions, Fireproof—Incombustible.*—Only fireproof material shall be used for fireproof partitions; if of brick, they shall be not less than four inches thick, and if of partition blocks, not less than three inches thick. If fireproof partitions are of reinforced concrete they shall be not less than two inches thick.

All fireproof partitions shall be supported directly by the steel construction, or by the fireproof floor arches, or stone concrete, or brick. No cinder concrete or wood flooring shall intervene between any such partition and its support.

All doors, windows, sashes, frames, casings and glass in fireproof partitions shall be built as require in Section 525 of this chapter.

Only fireproof or incombustible material shall be used in the construction of incombustible partitions, excepting that frames, casings, doors, sash and the rough carpenter work

required for the proper fastenings of such frames, casings, doors or sash, may be of wood, and that ordinary glass may be used in doors and partition windows.

Sec. 534. *Stairs, Landings.*—Stairs in fireproof buildings shall be built of approved cement concrete, reinforced concrete, stone or with metal supports, metal strings, metal treads, metal platforms, or a combination of one or more of such materials.

If reinforced concrete is used in the construction of any stairs in a fireproof building, such stairs shall be designed according to the provisions of the sections applying to reinforced concrete.

Stairs shall carry a live load of not less than one hundred pounds per square foot on treads and landings, and every part of a stair shall be so designed that the safe limit of fiber stress is not exceeded.

The hand rails of such stairways may be of wood, all other material in such stairways in fireproof buildings shall be "fireproofed," or "incombustible" material, except cinder concrete.

If stairs are constructed of solid concrete, having the tread and riser in one piece, then there shall be not less than forty-five square inches of concrete in the cross section of such combined tread and riser, and such stairs shall have reinforced concrete or metal outer strings.

If stone treads or platforms are used they shall have a metal sub-tread, or sub-platform, of the same weight as if the metal alone were used.

If platforms have a floor arch sub-construction as described in Section 529 of this chapter, then the metal sub-platform may be omitted.

Sec. 535. *Painting.*—All structural metal which is used in a fireproof buildings, or which is used in any foundation, or which is used in reinforced concrete work, shall be clean and free of rust, or scale at the time of the enclosure or covering of such metal. All metal which is not to be fireproofed shall have two coats of first-class metal protecting paint.

Sec. 536. *Rivets, Machine Driven.*—All structural steel and iron work shall be so riveted that the distance from the center of the rivet hole to the edge of the materials shall be not less than:

- $\frac{5}{8}$ inch for $\frac{1}{2}$ -inch rivets.
- $\frac{7}{8}$ inch for $\frac{5}{8}$ -inch rivets.
- $1\frac{1}{4}$ inches for $\frac{3}{4}$ -inch rivets.
- $1\frac{3}{8}$ inches for $\frac{7}{8}$ -inch rivets.

Wherever possible, however, the distance from the rivet hole to the edge of the material shall be equal to two diameters of such rivet hole. All rivets, wherever practicable, shall be machine driven; the rivets in connection shall be proportioned and placed to suit the stresses, and the pitch of rivets shall never be less than three diameters of the rivets nor more than six inches. All holes shall be punched accurately, so that upon assembling a cold rivet will enter the hole without straining the material by drifting. The rivets shall fill the holes completely, and, whenever necessary, gussets shall be provided of thickness and size to accommodate the number of rivets necessary to make a connection.

Sec. 537. *Truss Designs to Be Submitted.*—When steel or iron trusses are used the trusses shall be of such design that the stress in each member may be calculated and all trusses when placed shall be held rigidly in position by an efficient system of lateral and sway bracing, and any member of a truss subjected to transverse stress in addition to direct tension or compression shall have the stress causing such strain

added to the direct stresses coming on the member, and the total stresses shall in no case exceed the stresses provided for in Section 594 of this chapter.

Sec. 538. *Trusses to Be Inspected.*—On all buildings in process of construction, where the plans call for the use of trusses, or iron and steel structural work, the erection of such iron and steel structural work and of such trusses shall be inspected thoroughly by an inspector from the Building Department of the city, and such inspector shall be a man well versed in the design and construction of structural steel and iron work, and it shall be the duty of such inspector to see that the provisions of this chapter are strictly complied with, and such inspector shall have the authority to compel the contractors and builders to use a sufficient amount of temporary bracing or guys necessary to insure the safety of the work during its erection and to compel such contractors and builders to keep all derricks, tackles and hoisting appliances used in such work in a safe condition and to enforce all the provisions of this chapter.

Sec. 539. *Bolts to Be Turned and Holes to Be Reamed.*—Wherever it is found impossible to rivet connections as herein described and such connections are bolted, the bolts shall be turned and the holes reamed so as to get a perfect fit.

All structural members which are temporarily bolted together shall be well bolted in every alternate hole.

Sec. 540. *Fireproof Buildings, Height Of.*—The height of a fireproof building shall be measured from the average inside grade line of the street frontage of the building to the top of the highest point of the external bearing walls. Roof houses for elevators, or tanks, or skylights, or stairs, or scutles may be built above the height of the main roof, and no building shall be erected in the city of greater height than two hundred and sixty feet.

Sec. 541. *Roofs, Rise of Roof Above Limit of Height.*—In the case of buildings which are entirely fireproof in their construction, and of which the roof is also entirely of fireproof construction, the roof may rise above the limit of height of wall fixed by this chapter for such buildings at a slope not to exceed thirty degrees with the horizon, and to a height not exceeding twenty feet above such limitation of the height of such wall. The space enclosed by such roof above the limitation of the height of such wall may be used as an enclosure for pipes, ventilating or elevator machinery or for ventilating ducts, but it shall not be lawful to use such space for purposes of storage, business or residence.

Sec. 542. *Sheet Metal Work, Support Of.*—Wood shall not be used as the support of any sheet metal work or of any gutter or cornice of a building more than one hundred feet in height.

Sec. 543. *Reinforced Concrete—Regulations in regard to the Use Of.*—The term "reinforced concrete," as used in this chapter, shall be understood to mean an approved concrete mixture reinforced by steel of any shape, so combined that the steel will take up the tensional stresses and assist in the resistance to shear.

Sec. 544. *Stress.*—Reinforced concrete construction shall be of such nature that the stresses can be calculated according to the accepted formulas of modern concrete engineering practice.

Sec. 545. *Permission to Erect.*—Before permission to erect any reinforced concrete structure is issued, complete drawings and specifications shall be filed with the Commissioner

of Buildings, showing all details of the construction, the size and position of all reinforcing rods, stirrups, etc., and giving the composition of the concrete.

Sec. 546. *Concrete—Mixing Of—Method of Testing.*—The concrete shall be mixed in the proportions of one of cement, three of sand and five of stone, gravel or slag. The proportions shall be such that the resistance of the concrete to crushing shall not be less than two thousand pounds per square inch after hardening for twenty-eight days. The tests to determine this value shall be made by a competent engineer under the direction of the Commissioner of Buildings. The concrete used in reinforced concrete construction shall be what is usually known as a wet mixture.

Sec. 547. *Cements—Method of Testing.*—Only high-grade Portland cements shall be used in reinforced concrete construction. Such cements, when tested neat, shall, after one day in air, develop a tensile strength of at least two hundred pounds per square inch; and after one day in air and six days in water shall develop a tensile strength of at least five hundred pounds per square inch; and after one day in air and twenty-seven days in water shall develop a tensile strength of at least six hundred pounds per square inch. Other tests as to fineness, constancy of volume, etc., made in accordance with the standard method prescribed by the American Society of Civil Engineers' Committee, may from time to time be prescribed by the Commissioner of Buildings.

Sec. 548. *Sand—Stone, Crushed Slag or Gravel—Steel.*—The sand to be used in such concrete shall be clean, sharp torpedo sand free from loam or dirt.

The stone used in such concrete shall be clean, crushed stone or gravel, or crushed blast furnace slag of a size that will pass through a three-quarter-inch ring. The stone shall be fresh broken and the gravel shall be thoroughly washed.

The steel used shall be calculated according to its elastic limit; for moving or vibrating loads a steel of a lower elastic limit than is used for quiescent loads shall be used.

Sec. 549. *Reinforcing—Method Of.*—All reinforcing steel shall be completely enclosed by the concrete, and such steel shall nowhere be nearer to the surface of the concrete than the diameter of such reinforcing steel bar, or rod or other shape. The steel in beams or girders shall be so disposed that there shall be not less than one and one-half times the thickness of the steel in concrete between the steel, and where more than two bars are used the bars shall be placed in two or more planes.

Reinforced concrete shall be so designed that the stresses in the concrete and the steel shall not exceed the following limits: Extreme fiber stress on concrete in compression, five hundred pounds per square inch; shearing stress in concrete, seventy-five pounds per square inch; concrete in direct compression, three hundred and fifty pounds per square inch; tensile stress in steel, one-third of the elastic limit; shearing stress in steel, ten thousand pounds per square inch.

The adhesion of concrete to steel shall be assumed to be seventy-five pounds per square inch of surface where bars are three-quarters of an inch or less in diameter and proportionately less for bars of a diameter greater than three-quarters of an inch.

The ratio of the moduli of elasticity of concrete and steel shall be taken as one to twelve.

The following assumption shall guide in the determination of the bending moments due to external forces: Beams and girders shall be considered as simply supported at the ends, no allowance being made for continuous construction over

supports. Floor plates, when constructed continuous and when provided with reinforcement at top of plate over the supports, may be treated as continuous beams, the bending moment for uniformly distributed loads being taken at not less than $W \cdot L$, divided by eight; the bending moment may be taken at $W \cdot L$, divided by twenty in the case of square floor plates which are reinforced in both directions and supported on all sides. The floor plate to the extent of not more than five times the width of any beam or girder may be taken as part of that beam or girder in computing its moment of resistance.

The moment of resistance of any reinforced concrete construction under transverse loads shall be determined by formulas based on the following assumptions:

(a) The bond between the concrete and steel is sufficient to make the two materials act together as a homogeneous solid.

(b) The strain in any fiber is directly proportionate to the distance of that fiber from the neutral axis.

(c) The modulus of elasticity of the concrete remains constant within the limits of the working stresses fixed in this chapter.

From these assumptions it follows that the stress in any fiber is directly proportionate to the distance of that fiber from the neutral axis.

The tensile strength of the concrete shall not be considered.

Sec. 550. *Construction—Reinforced Concrete.*—Reinforced concrete construction shall be designed so that the shearing stresses, both vertical and horizontal, developed in any part of the construction, shall not exceed the safe working strength of the concrete as fixed in this chapter, or a sufficient amount of steel shall be introduced in such a position that the deficiency in the resistance to shear is overcome.

When the safe limit of adhesion between the concrete and steel is exceeded, some provision shall be made for transmitting the strength of the steel to the concrete.

Sec. 551. *Columns—Reinforced Concrete.*—Reinforced concrete may be used for columns when the ratio of length to the least side or diameter does not exceed twelve. The reinforcing rods shall be tied together at intervals of not more than the least side or diameter of the column, or spirally wound steel may be used.

When vertical reinforcing rods are used in columns, such rods shall have their ends milled normal to the longitudinal axis, and such rods shall have full perfect bearings at each joint, and such joints shall occur only at floors or other points of lateral support and a tight fitting sleeve shall be provided at all joints of vertical reinforcing rods.

Sec. 552. *Wind Pressure.*—In the case of buildings in which allowances must be made for wind pressure as provided in Section 603 of this chapter, the reinforcing rods of columns shall be connected and the milled end surfaces shall be brought together by threading the rods and by threaded sleeve nuts, or threaded turnbuckles, or methods equally effective and satisfactory to the Commissioner of Buildings.

Sec. 553. *Tests—To Be Made by Contractor on Demand.*—The contractor shall be prepared to make load tests on any portion of a reinforced concrete construction within a reasonable time after erection, as often as may be required by the Commissioner of Buildings. Such tests shall show that the construction will sustain a load twice that for which it is designed, without any sign of failure, or in the case of beams,

girders or floors, without deflecting more than one-seven-hundredths of the span.

Sec. 554. *Reinforced Concrete Walls.*—Buildings of Classes I, II, III, VI and VII having a complete skeleton construction of steel or of reinforced concrete construction or a combination of both, designed to safely resist all of the strains caused by the dead weights of the structure and of the live loads and of the wind pressure within the safe limits of stress provided in this chapter for each material used, may have walls of reinforced concrete six inches thick for the upper two stories and walls seven inches thick for the two stories next below the upper two stories, and walls eight inches thick for the stories next below the upper four stories, and walls nine inches thick for the stories next below the upper six stories, and so on downwards, increasing the thickness of the walls one inch for each two stories or part thereof. Provided, however, that such walls shall support only their own weight, and that such walls have steel rods three-quarters of an inch in diameter or of an equivalent area set vertically, and spaced not more than eighteen inches apart, and steel rods five-eighths of an inch in diameter or of an equivalent area set horizontally tied to the vertical rod at each intersection with these, and set not to exceed twenty-four inches apart; and provided that where the weight of the walls of each story is not transferred to the skeleton by spandril beams, the vertical reinforcement shall be increased in weight in an arithmetical ratio of twice as much steel in the two stories next below the upper two stories, and three times as much steel in the two stories next below the upper four stories, and so on downward. Vertical bars shall be spliced together by winding with iron wire. Horizontal bars shall be wired to the columns. Additional bars shall be set around openings, the verticals wired to the nearest horizontal bars and the horizontal bars at top and bottom of openings shall be wired to the nearest vertical bars.

The steel rods shall be combined with the concrete and placed where the combination will develop the greatest strength, and the rods shall be staggered or placed and secured to the steel or reinforced concrete structural skeleton of the building, so as to resist a pressure of fifty (50) pounds per square foot, either from the exterior or from the interior on each and every square foot of each wall panel.

Sec. 555. *Molded Hollow Concrete and Hollow Tile Block.*—Molded hollow concrete blocks or molded hollow vitrified clay building blocks of the full thickness of a ten-inch wall may be used wherever eight-inch walls are called for by this chapter, and such blocks may also be used wherever twelve-inch brick walls are called for in this chapter under frame cottages and in one and two story Class III and Class VI buildings.

ARTICLE XIII.

SLOW-BURNING CONSTRUCTION.

Sec. 556. *Slow-Burning Construction Defined.*—The term "slow-burning construction" shall apply to all buildings in which the structural members which carry the loads and strains which come upon the floors and roofs thereof are made wholly or in part of combustible material, but throughout which the structural metallic members shall be protected against injury from fire by coverings of incombustible, non-heat conducting material similar to those described under the head of "skeleton construction," except that plastering and metallic lath may be used as provided herein. In the case of columns the metallic lath shall be fastened to metallic furrings and the plastering upon the same shall be of three

coats of mortar. The lower five (5) feet of each column shall be protected as required for brick, concrete or tile covering in Section 522 of this chapter. A covering of three (3) coats of plastering on metallic laths shall be considered sufficient protection for the under side of joists and girders and a layer of mortar or other incombustible material at least one and one-half inches thick shall be applied on all floors and roof surfaces above the joists of the same.

Sec. 557. *Posts, Partitions and Elevator Enclosures.*—Where oak posts of greater sectional area than one hundred square inches are used, they need not be covered. All partitions and all elevator enclosures in buildings of this type shall be made entirely of incombustible material. The use of wood furring or of stud partitions shall not be allowed in buildings of this type.

Sec. 558. *Stairs—To be Incombustible.*—Amended by ordinance Nov. 25, 1907, to read as follows:

Where buildings are required to be of "slow burning construction," all stairs in such building shall be of incombustible material; provided, however, said stairs may be of ordinary construction, if said building is equipped with an automatic sprinkler system, and stairs are enclosed in a fireproof wall.

ARTICLE XIV.

MILL CONSTRUCTION.

Sec. 559. *Mill Construction Defined.*—The term "mill construction" shall apply to all buildings in which all the girders and joists supporting floors and roof have a sectional area of not less than seventy-two square inches, and above the joists of which there is laid a timber floor not less than three and three-fourths inches thick. Wooden posts used in buildings of this type shall not be of smaller sectional area than one hundred square inches.

Sec. 560. *Fireproofing.*—Partitions and elevator enclosures in buildings of this type shall be made entirely of incombustible material. If iron columns, girders or beams are used in buildings of this type, they shall be protected as specified in this chapter, but the wooden posts, girders and joists need not be protected by fireproof covering. The use of wood furring, wood laths or stud partitions shall not be permitted in buildings of this type.

Sec. 561. *Stairs—To be Incombustible.*—Amended by ordinance Nov. 25, 1907, to read as follows:

Where buildings are required to be of "mill construction," all stairs in such buildings shall be of "incombustible" material; provided, however, said stairs may be of ordinary construction, if said building is equipped with an automatic sprinkler system and stairs are enclosed in a fireproof wall.

Sec. 562. *Concrete Construction—Approved Cinder.*—The term "approved cinder concrete construction" shall apply to all buildings in which all parts that carry weights or resist strains, all exterior walls, all interior walls, all interior partitions, all stairs and all elevator enclosures are made entirely of incombustible material, and in which all metallic structural members are protected against the effects of fire by approved cinder concrete proportioned, mixed, applied and secured as herein described. Approved cinder concrete construction may be used for all buildings in which fireproof construction is mandatory by this chapter, or where ordinary construction may be used.

Approved cinder concrete shall consist of a standard Portland cement, torpedo sand, and clean, thoroughly burnt steam

boiler cinders, free from deleterious matter, no particle of which shall be larger than one inch.

Sec. 563. *Cinders—Quantity.*—The volumetric quantity of cinders combined with the torpedo sand shall not exceed the volume of the Portland cement by more than eight (8) times. All of the ingredients of approved cinder concrete shall be thoroughly worked and wet so as to cover each piece of cinder with moistened cement; and the cement and sand shall fill all of the voids between the cinders.

All approved cinder concrete shall be cast and rammed in an unset condition against the metal.

The minimum thickness of approved cinder concrete covering in structural metal shall be two (2) inches. In every case the thickness of the coverings shall be measured from the extreme projection of the metal, including the plastering and in all cases the cinder concrete shall be rammed solid against the column metal, filling all channels and open spaces within the perimeter of the finished plaster column. Approved cinder concrete column covering shall have metal binders of No. 8 gauge wire imbedded in and around the columns for each sixteen (16) inches in height of the column, provided, however, that in buildings of approved cinder concrete construction the columns may be covered with one thickness of metal furring, metal lathing and not less than three coats of mortar.

In places where there is trucking or wheeling, or handling of packages of any kind, the lower five (5) feet of every column shall be incased in a protective covering such as is described in Section 522 of this chapter.

Sec. 565. *Beams and Girders—Approved Cinder Concrete Construction.*—The beams and girders of a building built of approved cinder concrete construction shall be enclosed in approved cinder concrete which shall be not less than two (2) inches in thickness at any and all points of the structural metal work. The approved cinder concrete covering shall be reinforced with metal clips of wire binders, either or both of which shall not be more than sixteen (16) inches on centers in the direction of the length of the structural member.

The top of all girders or beams shall be protected with not less than two (2) inches of approved cinder concrete.

A floor or roof construction of approved cinder concrete may be used for any span between structural members that will carry the test loads required by this chapter for such floors and roofs.

Sec. 566. *Segmental Arches.*—Segmental arches shall be not less than three (3) inches in thickness at the crown.

Sec. 567. *Floors—Flat Slab Construction.*—Flat slab floor construction shall be not less than four (4) inches in thickness for spans of eight (8) feet or less. Flat slab floor construction shall be not less than five (5) inches in thickness for spans between eight (8) and ten (10) feet.

Approved cinder concrete shall not be used as a floor or roof construction unless such approved cinder concrete is reinforced by steel or iron, and such reinforcement shall not weight less than three-quarters of a pound per square foot of superficial surface.

All reinforcing steel shall be completely enclosed by the concrete.

Wood nailing strips for floor surfacing may be used in buildings of approved cinder concrete construction, provided, however, that such nailing strips shall be imbedded as described in Section 531 of this chapter.

Sec. 568. *Partitions.*—The partitions in buildings of approved cinder concrete construction shall be as described in Section 532 of this chapter for partitions in fireproof buildings, provided, however, that partitions may be built wholly of metal studding, metal lath and plaster, but no such partitions shall be of a less thickness than one and one-half (1½) inch.

The partitions around stairs, or stair halls, or shafts, or elevators, or public lavatories, shall be wedged tight between the structure of the floors and ceilings, or if such partitions are of plaster, the metal or metal studding shall be secured to the structure by clips, bolts or other metal fastening, and in no case shall any such partition be built on the wood flooring or wood nailing strips.

Sec. 569. *Walls—Enclosing.*—The enclosing walls, the covering of exterior side of mullions, beams, girders, lintels, the enclosures of pipes, pipe shafts the doors into shafts, windows into shafts, covering of girders, covering of trusses, cut-out boxes, chases, stairs, landings, painting, rivets, bolts, and all other items required in these sections on fireproof construction and in the sections on skeleton construction shall, in buildings of approved cinder concrete construction, be designed or built or covered, or made of the material called for, or any one or a number of these requirements, as described in such sections, describing the requirements of skeleton construction or of fireproof construction in this chapter, provided, however, that approved cinder concrete as described herein may be used for all protective covering of structural metal.

ARTICLE XV.

ORDINARY CONSTRUCTION.

Sec. 570. *Ordinary Construction Defined.*—The term "ordinary construction," as used in this chapter, means the ordinary system of construction in which timber and iron structural parts are not protected with fire resisting coverings.

ARTICLE XVI.

GENERAL CONSTRUCTION REQUIREMENTS.

Sec. 571. *Construction or Alteration of Buildings.*—Every building or structure, or part thereof, hereafter constructed, erected, altered, enlarged or changed anywhere within the city, shall be so constructed, erected, altered, enlarged or changed only in accordance with the provisions of this chapter.

Sec. 572. *Materials.*—Materials used in the construction of buildings of all classes shall conform to the following specifications:

Sec. 573. *Foundation Proportions.*—Foundations shall be proportioned to the actual average loads they will have to carry in the completed and occupied building.

Sec. 574. *Foundation Construction.*—Foundations shall be constructed of either of the following: Approved cement concrete, dimension or rubble stone, sewer or paving bricks or iron or steel or piles. If iron or steel is used the filling and the coating of the same shall be of Portland cement as provided in Section 583 of this chapter, piles shall be covered with grillage of timber, concrete or steel, or a combination of these. Where timber grillage or timber piles are used, the top of such grillage or such piles shall be at least one foot below city datum.

Sec. 575. *Foundation of New and Old Walls.*—In all cases where there is an increase in the thickness of walls, a new foundation shall be built in such manner as to carry jointly both the new and old walls, and the soil under such foundations shall not be loaded beyond the limits hereinbefore specified in this chapter. All foundations shall be protected against the effects of frost, and frozen cement mortar shall not be used in connection with building operations.

Sec. 576. *Foundations—Pile Borings Required—Safe Load Required—Fiber Stress.*—Where pile foundations are used, auger borings of the soil shall first be made to determine the position of the underlying stratum of hard clay or rock, and the piles shall be made long enough to sustain the required load according to approved formulas for pile driving, and timber piles shall not be loaded more than twenty-five tons to each pile. The heads of the piles are to be protected against splitting while they are being driven, and after having been driven the piles are to be sawed off to a uniform level and covered with a grillage so proportioned that in the transmission of the load from the structure to the pile the extreme fiber stress of the grillage shall not exceed the safe limits for the respective materials as prescribed in this chapter. The safe compression load per square inch on concrete in concrete piles shall not exceed four hundred pounds. The area of the cross section shall be measured at a point six (6) feet below the head of the pile after the same has been set in place, and the cross section of the pile above this point shall not be reduced.

Sec. 577. *Foundations Other Than Pile.*—If foundations of other materials than piles are used, they shall be so proportioned that the loads upon the soil shall not exceed the limits for different kinds of soil than those hereafter given, to-wit:

Sec. 578. *Load for Various Soils.*—If the soil is a layer or pure clay at least fifteen feet thick, without admixture of any foreign substance excepting gravel, it shall not be loaded more than at the rate of three thousand five hundred pounds per square foot. If the soil is a layer or pure clay at least fifteen feet thick, and is dry and thoroughly compressed, it may be loaded not to exceed the rate of four thousand five hundred pounds per square foot.

If the soil is a layer of dry sand fifteen feet or more in thickness, and without admixture of clay, loam or other foreign substance, it shall not be loaded more than at the rate of four thousand pounds per square foot.

If the soil is a mixture of clay and sand it shall not be loaded more than at the rate of three thousand pounds per square foot.

Sec. 579. *Foundations in Wet Soil—Trenches to Be Drained.*—In all cases where foundations are built in wet soil, it shall be unlawful to build the same unless the trenches in which the work is being executed are kept free from water by bailing, pumping or otherwise, until after the completion of work upon the foundations, and in each case a connection with the street sewer shall be established before beginning the work of laying foundations.

Sec. 580. *Foundations—Where Not Permitted.*—Foundations shall not be laid on filled or made ground or on loam, or on any soil containing admixture of organic matter.

Sec. 581. *Foundations—Depth Below Surface—Least Limit—Depth Regulated by Sewer—Exceptions.*—Foundations shall in all cases extend at least four feet below the surface of the ground upon which they are built, and in the case

of all buildings forty feet or more in height, foundations shall extend at least to the depth drained by the street sewer in the neighboring streets or alleys; but if such sewers are at a greater depth than ten feet below the sidewalk grade, such foundations need not extend to a greater depth than ten feet, provided that sound, hard soil is found at that depth.

Sec. 582. *Concrete—Broken Stone—Sand—Cement—Mortar—Foundations Of.*—Broken stone or concrete in making foundations shall be clean and free from dirt and dust. And sand shall be free from admixture of loam and shall be otherwise clean and sharp.

Cement shall have been kept dry and shall be used fresh from the package; cement which has been permitted to become wet, hard or lumpy before it is mixed into the mortar or concrete shall not be used.

The use of concrete or mortar of any kind, the ingredients of which are not thoroughly and completely mixed and which are not free from lumps, or other unmixed portions of any of the ingredients, is prohibited; and also the use of cement mortar which has become partly or wholly set before use. Concrete foundations wherever used shall have boxes of plank all around them, and the concrete shall be well rammed in individual layers not more than six inches each in thickness. The ramming shall be continued until the water stands on the top of the mass of concrete.

Sec. 583. *Steel Rails or Beams in Concrete.*—If steel or iron rails or beams are used as parts of foundations, they shall be thoroughly imbedded in a concrete, the ingredients of which shall be such that after proper ramming the interior of the mass will be free from cavities, the beams or rails shall be entirely enveloped in concrete, and around the exposed external surfaces of such concrete foundations there shall be a coating of a standard cement concrete not less than four inches thick.

Sec. 584. *Concrete Foundations—Steps—Safe Load Where Reinforced by Beams.*—If concrete foundations are used by themselves and without the insertion of iron or steel beams or rails, the offset on top of same shall not be more than two-thirds the height of the respective courses, and such concrete foundations shall not be loaded more than twenty-five thousand pounds per square foot. If reinforced by iron or steel beams or rails, the loads and offsets in the same shall be so adjusted that the fiber stress upon the metal, if iron, shall not exceed twelve thousand pounds per square inch, or, if steel, that the fiber stress shall not exceed sixteen thousand pounds per square inch.

Sec. 585. *Dimension Stones—Safe Load.*—Dimension stones shall have uniform beds and the offsets in the same, where two or more layers are used, shall not be more than three-quarters of the height of the individual stones. They shall be set with full beds of cement mortar under their entire area, and in such manner that they will not rock after being set. Dimension stones in foundations shall not be subjected to a load of more than twenty thousand pounds per square foot in tiers.

If the beds of the stones are dressed and leveled off to a uniform surface and the stones are set in a standard cement mortar, this strain may be increased to twenty-five thousand pounds per square foot.

Sec. 586. *Rubble Stone.*—Rubble foundations and rubble walls shall be built of approximately square and flat bedded stones, well and thoroughly bonded in both directions of the walls, each stone thoroughly bedded in mortar under its entire area. Wherever walls of any kind are used as curb

walls, their exterior surfaces shall be rendered approximately water tight by a coating of a standard cement mortar.

Sec. 587. *Brick—Soft—Use Of—Bond—Safe Load.*—The use of soft bricks is prohibited in all parts of buildings exposed to the weather and in internal or external piers or bearing walls. The bond of brick work shall be formed by laying one course of headers for every five courses of stretchers. Brick work in walls laid in a standard Portland cement mortar shall not be loaded more than twenty-five thousand pounds per square foot. Brick work laid in an ordinary cement mortar shall not be loaded more than eighteen thousand pounds per square foot. Brick work in walls laid in lime mortar shall not be loaded more than thirteen thousand pounds per square foot.

Sec. 588. *Walls—Edges—Joists Supports—Walls Around Stairs, Elevators and Shafts.*—Whenever walls sixteen inches or less in thickness shall be used for the support of ordinary joists in buildings of all classes, ledges of the thickness of the furring, lath and plaster shall be formed between such joists and shall be carried up and leveled off on the line of the tops of the joists, or standard cast iron joist boxes shall be used for the support of such joists.

Where a stairway or an elevator shaft or an air shaft is surrounded by brick walls, such surrounding brick walls may be built sixteen (16) inches thick, excepting that the upper fifty (50) feet of the height may be built twelve (12) inches thick, but the length or breadth, or either, of such a stairway or elevator shaft or air shaft shall not exceed twenty-five (25) feet, and in no case shall the load on the brick of such wall or walls exceed the safe limits of load specified for brick work in this chapter.

Sec. 589. *Pressed Brick Facing—Bond Joints.*—If pressed brick facings are used, they shall be bonded into their backing every seventh course. Bond shall be established by solid headers or by blind headers. In the case of piers faced with pressed brick, only solid headers shall be used, but bond stones or iron bond plates may be substituted for such headers. Pressed brick in all cases shall be so laid as to have a full bed of mortar under its entire surface. The laying of pressed brick merely with a joint all around the outer edge of the bricks shall be unlawful.

Sec. 590. *Brick Piers—Offsets—Bond Stone—Cap Stone.*—In building brick piers there shall be provided at every offset in each pier, or at every point where such brick pier receives the load, a bond stone at least eight inches thick or a plate of rolled iron or steel not less than one-fourth of an inch in thickness, which stones or plates, if at the top of such pier, shall cover its entire surface, and shall in all cases be adapted to receiving the load to be imposed and shall be made of a strength which will keep the fiber strain upon the material used within the limits elsewhere herein stated.

Sec. 591. *Stone Facing Without Bond Courses.*—Stone may be used as facing for brick walls under the following conditions: If the facing is ashlar, without bond courses, and the individual course thereof measure in height between bond stones more than six times the thickness of the ashlar, then each piece of ashlar facing shall be united to the brick work with wrought iron anchors at least two to each piece and reaching at least eight inches over the brick wall, and hooked into the stone facing as well as the brick facing. Whenever ashlar as before described is used, it shall not be counted as forming part of the bearing surface of the wall, and the brick backing shall be of the thickness of wall herein specified for the different kinds of building.

Sec. 592. *Stone Facing with Bond Courses.*—If stone facing is used with bond courses at a distance apart of not more than four times the thickness of the ashlar, and where the width of bearing of the bond courses upon the backing of such ashlar is at least twice the thickness of the ashlar, and in no case less than eight inches, then such ashlar facing shall be counted as forming part of the wall and the total thickness of wall and facing shall not be required to be more than herein specified for walls of the different classes of buildings.

Sec. 593. *Stresses—Cast Iron—Fiber—Strains—Length.*—The stresses in materials used in construction produced by the calculated strains due to their own weight and applied loads shall in no case exceed the following:

CAST IRON.

Extreme fiber strain tension..... 2,500 lbs.
For columns 10,000 lbs.

Reduced by Gordon's formula. Reduced for eccentric load.

No cast iron column shall have a length to exceed twenty-four times its diameter, or least side.

Sec. 594. *STRESSES IN POUNDS PER SQUARE INCH.*

	Wrought Iron.	Steel.
Extreme fiber stresses, "I" beams and shapes	12,000	16,000
Extreme fiber stresses, built beams.....	10,000	15,000
Tension	12,000	15,000
Shearing	7,500	10,000
Direct bearing pins and rivets.....	15,000	20,000
Bending on pins	18,000	22,500
*For columns and compression members....	12,000	15,000

*Reduced for ratio of length of columns to its least radius of gyration by approved modern formulas, and reduced for eccentric loading.

Sec. 595. *TIMBER—STRESSES IN POUNDS PER SQUARE INCH.*

	Compression Perpendicular to Grain	Compression Parallel to Grain
	Fiber Along Grain	On Extreme Shearing
White Pine and Spruce.....	750	80
White Oak	1,000	150
Long-leaved Yellow Pine.....	1,250	100

Sec. 596. *Posts with Flat Ends—Stresses per Square Inch.*—

L. Length of posts in inches.

D. Least side or diameter of post in inches.

S. Stress per square inch.

White Pine Spruce.		L. L. Yellow Pine.		White Oak.
L. D.	S.	L. D.	S.	S.
0-10	625	0-15	1,000	750
10-35	475	15-30	875	650
35-45	375	30-40	750	500
45-50	300	40-45	625	400
		45-50	500	375

GENERAL PROVISIONS.

Sec. 579. *Walls—Eight-Inch Brick Wall—Height Limited.*—In no case, in any class of building, shall any eight-inch brick wall be more than fourteen feet in height.

Sec. 598. *Cement Concrete Walls—Solid.*—Approved cement concrete of the same thickness as is required where common brick or rubble stone is used, may be substituted for either of these materials wherever either is called for in this chapter.

Sec. 599. *Walls—Thickness Of.*—The thickness of walls set forth in the tables for the various classes of building shall, for each class of buildings, apply to all external enclosing walls, and also to such internal walls as may be required under the specifications of the different classes of buildings.

Sec. 600. *Bay Windows and Light Shafts—Material For.*—Bay or oriel windows and light shafts may be built of combustible material, as specified in Section 287 of this ordinance.

Sec. 601. *Buildings—Height Of.*—The limits of heights of buildings hereinbefore given for non-fireproof buildings, shall be from the average established sidewalk level to the highest point of roof thereof.

No buildings shall be erected in the city of greater height than two hundred and sixty feet from the sidewalk level to the highest point of external bearing walls. The erection of parapet walls or of balustrades constructed entirely of incombustible material is permitted above the roof level of buildings of all classes, and in addition to the heights herein fixed for the same. (See Sections 540 and 541.)

Sec. 602. *Floor Areas—Computation Of—For All Classes of Buildings—Stairs in Common.*—The floor area of all buildings shall be computed from the dimensions taken on the inner side of the exterior or surrounding walls on the floor of the third story, and the areas of courts, of elevator shafts, of enclosed stairs, if enclosed with incombustible materials, and of chimneys, shall not be considered as a part of such floor areas.

Where two areas of the same building adjoin, and are separated by fireproof dividing walls, they may have a stairway in common. Provided, however, in fireproof buildings such stairways shall be of incombustible material, enclosed in fireproof partitions, and access to such stairway shall be direct from each such area. Provided, however, in buildings of mill, slow-burning or ordinary construction, such stairways shall be of incombustible materials, enclosed by brick walls, and that doors to such stairways shall be automatic, self-closing standard iron doors, as described in Section 260 of this chapter, and all materials inside of such brick walls shall be fireproof or incombustible material.

Sec. 603. *Wind Pressure—Precautions Against.*—In the case of all buildings the height of which is more than one and one-half times their least horizontal dimension, allowances shall be made in both vertical and horizontal construction for wind pressure, which shall not be figured at less than thirty pounds for each square foot of external wall surface.

Sec. 604. *Basement—Meaning Of—Cellar—Meaning Of.*—Wherever in this chapter the words "basement story" are used, it is intended to mean that the floor of such story is at a distance of two feet or more below the level of the sidewalk, and that its height does not exceed eleven feet in the cellar. If the floor of such story is nearer than two feet above the sidewalk or if the ceiling of such basement is more than nine feet above the sidewalk grade, it shall be counted as the first story of the building in which it occurs, except in buildings of Class VI and Class VIII as defined in Sections 246 and 248 of this chapter.

"Cellar" is a story, the height of which is more than two-thirds below the level of the grade at the building.

Sec. 605. *Sub-Basements and Cellars—Construction Of.*—No building may have more than one basement or cellar of ordinary or slow-burning or mill construction, all additional basements or cellars shall be of fireproof construction, as described in this chapter, all elevator enclosures shall be of brick from the lowest basement floor level to the first story floor, and all stairways shall be enclosed in fireproof partitions from the lowest basement floor level to the first story floor level with automatic closing standard iron doors, opening outwards.

In cases where a pipe, conduit, dumb-waiter, cable, wire, conveyor or belt, or any combination thereof passes from one basement to another through a floor the opening in the floor shall be enclosed as specified in Sections 524 and 525 of this chapter.

The number and width of stairs from the lowest basement floor to the first story shall be the same as required for the four highest stories of a building of the same area.

Sec. 606. *Enclosures Upon Roofs—Parapets and Balustrades Upon Roofs.*—It shall be permitted to erect on the roofs of all buildings more than sixty feet and less than one hundred feet high, skylights, enclosures for water tanks and enclosures for elevator machinery, the construction of all of which enclosures shall be entirely of incombustible material; provided, however, that the roofs of same may be built of mill or slow-burning construction.

Sec. 607. *Fire Walls—When Dispensed With.*—Fire walls of brick not less than twelve inches thick shall be built extending above the roofs of buildings if such roofs are flat, and also above the roofs of all buildings where the same abut against another building, or where the same stand upon any line of any lot, excepting street or alley lines. Provided, that where eight-inch walls are permitted in the top story of buildings, or as provided in Classes III and VI for buildings not over three stories high, the fire walls shall be of the same thickness. Such fire walls, where they stand upon lot lines, or where they are over the dividing walls in the interiors of buildings where such are called for by this chapter, by reason of the great area of such buildings, shall extend at least three feet above the roofs of such buildings. Fire walls upon street and alley lines shall extend not less than eighteen inches above the roofs of such buildings. Fire walls may be dispensed with on street and alley lines if the tops of the roof boards and roof joists are protected against fire for a distance of at least five feet from such street or alley lines by a coating of deafening mortar on hollow tile or porous tile at least two inches thick. Fire walls at street and alley lines may also be dispensed with in all cases where the entire framing and materials of the roof shall be made strictly fireproof.

Walls facing upon courts and light shafts shall be treated as in the same category with walls facing upon streets and alleys.

Fire walls shall be covered with a weatherproof coping of incombustible material.

Sec. 608. *Window and Door Sills—Columns and Lintels Supporting Store Fronts—Incombustible.*—Window and door sills shall be made of incombustible material. Oak timber used for door sills and not less than eight inches thick by the full width of the wall in which such sills occur, shall, for the purpose of this chapter, be counted incombustible, but no other form or use of wood construction shall be considered incombustible.

The columns and lintels supporting store fronts in buildings within the fire limits of more than one story in height shall be made of incombustible material.

Sec. 609. *Roofs—Shingle or Gravel.*—The use of shingle roofs or of other forms of combustible roof covering upon buildings erected or altered within the fire limits is prohibited. Provided, however, that shingle roofs may be placed on buildings not exceeding two stories in height and two thousand square feet in area, but the shingles used on such roofs shall first have been dipped in fire-resisting paint, such fire-resisting paint to be approved by the Commissioner of Buildings.

Roofs whose slope is not more than three inches per foot horizontal, and the covering of which is made with a composition of felt and gravel, shall be considered incombustible under the provisions of this chapter, and may be used upon buildings of all classes.

Sec. 610. *Roofs—Construction of—Pitch Of—Strength Of.*—In the case of all buildings less than sixty feet in height, roofs having a slope of more than specified for composition roofs, may be made of timber and board construction, and shall be covered with incombustible material, except as provided in Section 609 of this chapter. The roofs upon buildings sixty or more feet and less than ninety feet high, and of greater slope than three inches to the foot and less slope than thirty degrees with the horizon, shall, if made of timber construction, have an incombustible covering upon the roof boards, which shall be made either of mortar or porous terra cotta or plaster boards, or other incombustible material, and which shall be at least two inches thick. If this covering is made upon the roof boards, wooden strips shall be inserted and securely fastened to the wooden substructure at regular intervals between the incombustible covering, and a weather-proof covering of incombustible material.

The roofs of all buildings of every kind and class shall be designed and constructed in such a manner that they will bear a load in addition to the weight of their structure and covering of at least twenty-five pounds for each square foot of horizontal surface.

Sec. 611. *Roofs—Pipes Carrying Water From.*—The water from all roofs shall be carried to the street sewers in metal conductor pipes, which shall be continually maintained in such condition that leaks therein will not cause the water to soak into the walls or any other part of the building.

Sec. 612. *Cornices—Gutters—Eaves—Parapets—Bay Windows.*—Where sheet metal cornices or external metal sheet gutters are used, their entire frame work and covering shall be of metal, and the walls shall extend behind all such cornices or gutters along their entire height. All metal work in and about any cornice, gutter, eave or parapet, or in or about any bay, or oriel window, shall be supported by suitable brackets placed not more than four feet apart and firmly secured to the wall. Wood shall not be used as the support of any gutter or cornice for buildings of one hundred feet or more in height.

Sec. 613. *Towers—Domes and Spires—Construction Of.*—Towers, domes and spires may be built on top of the roofs of buildings, but shall not occupy more than one-fourth of the street frontage of any building. Such towers, domes or spires, if any part thereof is built to a height of more than sixty feet and less than ninety feet, shall be of slow-burning construction, and if of greater height than ninety feet above the sidewalk shall be of fireproof construction; and in all cases where the area of such spire, dome or tower exceeds

one hundred square feet, its supports shall be carried down to the ground, and shall be, if the construction supported is more than sixty feet and less than ninety feet high, of slow-burning construction, and if more than ninety feet high, of fireproof construction.

Sec. 614. *Skylights—Construction Of—Glass In.*—Any skylight on the roof of any building, other than a frame building, shall have the sides, sashes and frames constructed of metal; or of wood, metal clad on all exterior surfaces.

The glass in all such skylights, except in frame buildings of Classes III and VI not exceeding three stories in height shall have at least six inches over same, a strong wire netting (wire not lighter than No. 8 and mesh not coarser than one and one-half inch by one and one-half inch), unless the glass contains a wire netting within itself.

Sec. 615. *Porches—Verandas—Porticos—Balconies—Construction of Inside Fire Limits.*—If verandas, porches or porticos are enclosed, the enclosing walls shall be made of incombustible material, the only exception being in case such porticos or verandas are to be made part of a storm house or of a storm door enclosure, which, however, shall in no case be more than twelve feet high, nor shall it occupy a greater frontage than two feet more than the width of the inner doors for which the storm doors are made.

Sec. 616. *Sidewalks—Occupation of by Parts of Buildings.*—The use of any part of the sidewalks for steps or for open areas is prohibited.

Sec. 617. *Chimneys—Walls Of—Height Above Roof.*—Amended June 5, 1906, to read as follows:

No chimney shall be built with less than four inches thick brick wall, and no chimney having a greater flue area than two hundred and sixty square inches shall have walls less than eight inches thick; provided that in all cases where chimneys are built with walls less than eight inches thick the same shall have flue liners of fire clay or terra cotta in their entire length. Except that where flues are to be used for gas grates or gas ranges, the flue lining may be omitted, but the inside of the flue shall be smoothly plastered. Chimneys that are built of fireproof composition composed of cinders, cement and burnt sand shall be no less than two and one-half ($2\frac{1}{2}$) inches thick, and perfectly smooth. Chimneys that are built of fireproof composition shall be built in two sections capable of being shoved into one another where it touches the roof; the flue hole of the base stone must be much larger than the lower part of the chimney, so that the said base stone incases the lower portion of the chimney, and both can move independent without cracking a joint in a section; there being an air space or a cooler between the flue hole of the base stone and the lower portion of the chimney. It is not necessary that this chimney should be lined with fire clay or terra cotta, as it is itself a fireproof composition. The use of unprotected metal flues inside of buildings will not be permitted.

Every chimney having an area of not more than two hundred and sixty square inches shall be carried up to at least five feet above the highest part of the roof of the building of which such chimney is a part, if such a roof is a flat roof. If the roof is a pitched roof the chimney shall be carried up at least two feet above the highest point of same.

Sec. 618. *Chimneys—Interior—Walls Of.*—Chimneys having a greater flue area than six hundred square inches shall, if built of brick, have surrounding walls of at least sixteen inches of brick work, and such walls shall be built hollow with at least four inches hollow space in such walls, at a

height of fifty feet above smoke inlet the thickness of the surrounding brick work may be reduced to twelve inches, but in all cases the surrounding walls of chimneys of this or any other size shall be so proportioned that the brick work in same will not be subjected to a greater stress than elsewhere herein fixed as a maximum safe stress for brickwork. For chimneys having a greater flue area than one thousand six hundred square inches the thickness of walls shall be increased above the thickness above specified, four inches for each increase of one thousand square inches or fractional part thereof.

Sec. 619. *Chimneys or Flues—Height above Roof.*—All flues having a greater area than two hundred and fifty square inches, and not more than six hundred square inches, shall be carried up at least twelve feet above the highest point of roof or building of which they form part; and all flues having a greater area than six hundred square inches and not more than nine hundred square inches, shall be carried up at least twenty feet above highest point of roof. All chimneys having a greater area than nine hundred square inches shall be carried to a height of at least twelve feet above any roof within a radius of sixty feet; provided that the top of the chimney shall be not less than twenty feet above the highest point of the roof of the building of which it forms a part.

Sec. 620. *Chimneys or Flues—Linings Of.*—All flues having a greater area than four hundred square inches shall be lined on the inside with insulating material, which lining shall start at least two feet below the smoke inlet, and for flues having an area of from four hundred to six hundred square inches shall extend twelve feet above smoke inlet, and for all flues of more than six hundred square inches, and not more than one thousand six hundred square inches, shall extend twenty feet above smoke inlet, and for all flues having a greater area than one thousand six hundred square inches, shall extend at least thirty feet above smoke inlet. If an internal smoke pipe of metal is used, so much of the brick work as is inside of the insulating cavity of the stack may be omitted. Metal smoke-stacks shall, however, be lined with insulating material for at least thirty feet of their height.

If internal stacks in buildings be made of metal then they shall be entirely surrounded within the building with a fireproof material which shall thoroughly protect the building from fire, and there shall be an air space, not less than four inches in the smallest part between the fireproofing and the metal stack.

Sec. 621. *Chimneys—Interior—Framing Around.*—No joists or girders shall rest and be supported on the walls of any chimney, and the framing around chimneys of all kinds shall be so constructed that in no case will any joists or timbers be placed nearer than two inches from the outside face of walls or flues, and in no case shall the distance from the inside of any flue to any joists or timbers be less than seven inches.

The foregoing shall apply only to chimneys which are enclosed by, or form part of, the interior of any building.

Sec. 622. *Chimneys—External—Location Of—Built of Iron or Steel.*—Chimneys may be built outside of the walls of existing buildings (but not in such manner as to encroach upon any street or alley), and shall be built as follows:

If at least one side of such chimney abuts entirely upon the wall of an existing building and the chimney is throughout its entire length securely and firmly anchored to the walls of such existing building, the wall of such chimney may be

built of hollow tiles, in which case, however, it shall have a cast iron base, lined with fire brick, and extending to a height of at least ten feet above the street or alley grade.

Such external chimney may also be built of rolled steel or iron not less than one-fourth inch in thickness, and lined with insulating material, laid in fire clay, for at least thirty feet above street or alley grade, or it may be built throughout its entire height of cast iron, in which case the first ten feet above street or alley grade shall be lined with insulating material; provided, however, that in chimneys not exceeding five hundred square inches in flue area, the upper twenty-five feet may be constructed of steel or iron not less than one-eighth inch thick.

Sec. 623. *Chimneys—Isolated.*—Isolated chimneys shall be so designed and constructed that the stress upon any part thereof, due from the weight of the stack itself and from wind pressure, shall never exceed the safe limits as provided in this chapter.

Sec. 624. *Chimneys or Smokestacks—Foundation Of.*—The foundations of chimneys or smokestacks, whether inside or outside of buildings, or whether connected with the same or isolated, shall be designed and built in conformity with the provisions relating to foundations of buildings hereinbefore given.

Sec. 625. *Smoke Flues Passing Through Partitions—Woodwork Around.*—Where smoke flues of diameter of six inches or less pass horizontally through a wood or a plastered stud partition, they shall be surrounded by a ventilated thimble of incombustible material.

Where a smoke flue of a greater diameter than six (6) inches passes through a wood or plastered stud partition, it shall be surrounded either by a body of brick, hollow tile, porous terra cotta or other incombustible substance, measuring at least eight (8) inches all around such smoke flue. Smoke flues of less diameter than twelve inches shall be kept at least twelve inches distant from any combustible partition, ceiling or floor, and such woodwork immediately over and for a distance of two feet on each side of such smoke flue shall be covered with sheet metal or with porous terra cotta, hollow tile or with plaster.

Smoke flues of greater diameter than twelve inches and less area than six square feet, shall be kept at least twenty inches away from any woodwork, and such woodwork shall be protected as before specified for the smaller smoke flues to a distance of four feet on each side of such smoke flues.

Wherever smoke flues of larger area than six square feet are used they shall be kept at least three feet distant from any woodwork, and such woodwork for a distance of at least six feet on either side of such smoke flues shall be protected as before specified for smaller flues.

Sec. 626. *Floors—Protection Of—Around Boilers, Furnaces, Etc.*—Wherever steam boilers or furnaces or ovens, coffee roasters or other structures in which fires are maintained, are set inside of a building, or in a room with wooden floor or ceiling construction, the floor of the same shall be protected by a covering of brick or concrete not less than five inches thick set in mortar upon a continuous sheet metal bearing plate not less than three-sixteenths of an inch thick, all the joints of which are to be securely riveted, and the edges of which are to be turned up five inches all around. This foundation of sheet metal and brick and concrete shall extend under the whole of the fire box and ash pit of such steam boiler or furnace or other structure, and to a distance

of not less than ten feet in front and at least four feet on the other three sides of same.

Sec. 627. *Ceiling—Protection Of—Around Boilers, Furnaces, Etc.*—The space between the tops of such steam boiler or furnaces and any wood ceiling construction shall in no case be less than three feet, unless such boiler be a low pressure boiler, in which case such space shall be not less than eighteen inches, and the under side of such wood ceiling construction shall in all cases be protected either by three coats of plastering or metallic lath or wire netting, or at least two inches of porous terra cotta plastered on the under side, or by a covering of hollow tile with two air spaces at least one-half inch each between the wood and the under surface thereof, which under surface shall also be covered with a heavy coat of plastering.

Sec. 628. *Boilers—Location Of—Permit For.*—In all cases boilers shall be so placed as to give ample room between any ceiling, wall or partition to connect or operate any valves or pipes or other connections used on such steam boilers, and in buildings of 4,000 or more square feet in area, the size, number and location shall be marked on the plans before a permit is issued by the Building Department.

Sec. 629. *Cupolas of Foundries.*—Cupolas of foundries shall extend at least ten feet above the highest point of any roof within a radius of forty feet of such cupola, and shall be covered on top with wire netting.

Sec. 630. *Pipes for Distribution of Hot Air—Registers.*—Where pipes are used for the distribution of hot air from a hot air furnace, such pipes shall be made of metal and shall be double. The space between the two metal pipes shall be at least one-half inch. Such pipes are to be made with air tight joints and to be securely fastened to the partitions through which they pass.

The openings in floors for hot air registers shall be surrounded with borders of incombustible material not less than two inches wide, and firmly and securely set in place. The register boxes shall be double, the distance between the two thicknesses of tin being at least one inch.

Sec. 631. *Pipes, Ducts and Registers—Material For.*—Where the air conveyed through pipes is heated in an ordinary hot-air furnace, or in any other apparatus by direct contact of the air with a fire box, the material used for these double ducts, pipes and register boxes shall be bright tin, and the joints shall be double-seamed, but not soldered. Where the air is heated by contact with hot water or steam pipes, any other sheet metal may be used for the pipes, and the use of double pipes is not obligatory.

Sec. 632. *Doors and Windows—When Required to Be Closed—Fire Resisting Glass.*—Wherever the distance between doors and windows in buildings of Classes I, II, IV, V, VII and VIII on opposite sides or alleys or courts shall be less than thirty feet, or wherever the distance between such doors and windows and any inside lot line of any lot upon which any such building is erected is less than fifteen feet, or wherever the distance between such doors and windows and the alley line (where the alley is less than thirty feet wide) is less than fifteen feet, such windows and the glazed portion of such doors shall be made of fire-resisting glass, set in frames of incombustible material.

Where the windows in buildings of Class I on lot line courts are less than two feet from the lot line the sashes shall be stationary.

The provisions of this section shall not apply to frame buildings of any class.

As amended by ordinance of October 22, 1906.

This section shall not apply to buildings of Class I, one story in height and having a floor area of less than twelve hundred and fifty square feet, nor shall it apply to buildings of Class II not more than two stories in height.

As amended by ordinance of February 18, 1907.

Sec. 633. *Class of Building Not to Be Changed Without Conforming to Provisions of This Ordinance.*—If buildings, the uses of which bring them within any of the classes mentioned in this chapter are to be applied to the uses of any other class for which a better system of construction is called for by this chapter, the construction and equipment of such buildings shall first be made to conform to the requirements of this chapter as specified for their intended use. And it shall be unlawful to apply any such building to a new or different use than that to which its structure and equipment adapts it under this chapter, unless the requirements of this chapter for such new or different use shall first have been complied with, and a permit for such alteration of use shall have been first obtained from the Commissioner of Buildings.

Sec. 634. *Alteration of Existing Buildings.*—Amended by ordinance Feb. 3, 1908, to read as follows:

Nothing in this chapter contained shall be considered as requiring alterations in the construction or equipment of buildings in existence at the time of the passage of this chapter, unless such buildings shall not have sufficient or adequate means of egress therefrom or ingress thereto by reason of insufficient or inadequate stairways, or stairways improperly located, or insufficient or inadequate elevators or elevator equipment, doors, fire-escapes, windows or other means of egress or ingress.

Whenever an Inspector of Buildings shall make a report to the Commissioner of Buildings that any such building has inadequate or insufficient means of egress therefrom or ingress thereto, as aforesaid, he shall notify the owner, agent, or person in possession, charge or control of such building of such fact and direct him forthwith to make such alterations and changes in the construction or equipment of such building as are necessary to be made in order to promote the safety of the occupant of such building, and of the person using the same, and of the public.

If, however, it is desired to enlarge, or in any manner materially modify the construction of any existing building, or to make change in its use or occupation which will transfer it from one class as recognized by this chapter to another class, then before such enlargement or structural change or modification of building is made, or before such change in its use or occupation may be made, the entire building shall be reconstructed or modified in such manner as to bring the same, when enlarged or altered, or when occupied for its new and different purposes, in accordance with the provisions of this chapter.

Sec. 635. *Walls of Altered Buildings—Increasing Thickness Of.*—If the walls of a building are not of sufficient thickness to comply with the requirements of this chapter for an enlarged or modified building, then the thickness of the existing walls shall be increased by building alongside of them a new wall, which shall not, however, be less in any part thereof than twelve inches thick, and which shall be increased in thickness by four inches for at least every forty feet in the height of such wall. Such new wall shall be laid in Portland cement mortar and shall be anchored to the old wall (bonding with brick or masonry will not be considered as

complying with this chapter); and if an increase in the height of the building is contemplated, the wall from the top of the old wall shall be built jointly upon the new and old walls. If solid masonry buttresses are introduced in connection with such thickening and strengthening of existing walls, the intervening wall may be reduced to eight inches in thickness, provided such buttresses are sufficient in number and in area to make the resultant structure of equal strength with the solid wall already specified. Provided, however, that steel or iron columns or beams may be used instead of such new wall, such columns or beams to be bolted or bonded to the existing wall in a manner satisfactory to and approved by the Commissioner of Buildings.

Sec. 636. *Walls—Party.*—The provisions of the preceding section shall also apply to all cases where existing party walls are to be joined to for the erection of new buildings. But in the case of party walls, which at the time of their erection were built in accordance with the terms of the city ordinances then in force, such walls, if sound and in good condition, may be used without increase of thickness for any building not higher than and of the same class as the building for which the original wall was built.

Sec. 637. *Walls—Erection Of—Walls and Skeleton Framework Securely Braced.*—In the erection of buildings of masonry construction, no wall shall be carried up at any time more than two stories above another wall of the same building. The walls and skeleton framework of all buildings shall be kept securely braced and otherwise protected against the effects of the weather during all building operations.

Sec. 638. *Tanks on Roofs—Permits—Fees.*—It shall be unlawful for any person to construct, maintain, or to allow or permit to remain, in or upon the roof of any building in the city, any water tank of a larger capacity than four hundred gallons, unless such tank shall rest upon a good and sufficient foundation of solid brick or stone masonry, or upon iron girders set on steel plates, which rest upon a good and sufficient foundation of solid brick or stone masonry, or upon iron or steel construction; provided, however, that no water tank of a capacity exceeding four hundred gallons shall be constructed in or upon any building without first submitting to this department a complete set of plans, showing the construction in detail of the supports and foundation of the tank; said plans are to be approved by the Department of Buildings, and a permit is to be taken out by the contractor for the substructure, for which permit a fee of five (\$5) dollars shall be charged.

Amended Nov. 25, 1907.

Sec. 639. *Stairs and Fire Escapes—Obstruction Of.*—It shall be unlawful under any circumstances to close up or obstruct during the occupation for business purposes of any building, the stairways or fire escapes or the approaches leading thereto, and no change in the position or construction of any such stairway or fire escape shall be made, unless the permission so to do of the Building Department first shall have been obtained.

ARTICLE XVII.

FRAME BUILDINGS.

Sec. 640. *Permits for Raising or Altering Buildings—Requirements.*—Permits to alter or raise frame buildings shall be given, provided they do not involve an enlargement or raising of such buildings beyond the limits of dimensions herein prescribed for frame buildings, and if the stresses

upon the material thereof are kept within the safe limit of stresses herein prescribed in this chapter, and if, further, such frame building has not been damaged to any extent greater than fifty per cent of its original value by fire, wear and tear, and action of the elements or otherwise. Provided, however, where any frame building is raised for the purpose of erecting a basement story under the same, the walls inclosing such basement shall be of masonry.

Sec. 641. *Strength of Timber Constructions—Outside of Fire Limits.*—The provisions of this chapter as to the strength and stability of timber constructions shall also apply to the construction of frame buildings outside of the fire limits.

Sec. 642. *Frame Buildings Prohibited—Exception.*—Hereafter no frame building shall be erected within the fire limits of the city, except where express provision is made in this chapter therefor.

Outside of the fire limits it shall be lawful to erect frame buildings not exceeding forty feet in height from the sidewalk to the highest point of roof. If such frame buildings have a basement story of masonry, their height above the sidewalk may be made not to exceed forty-five feet.

Sec. 643. *Frame Buildings Inside Fire Limits—Altered or Enlarged.*—No existing frame buildings inside the fire limits shall be altered or enlarged beyond the limit of height and dimensions described in Sections 642 and 646 of this chapter.

Sec. 644. *Frame Buildings Inside the Fire Limits Changed into Flat Buildings—Fire Walls.*—Whenever any frame building inside the fire limits shall be remodeled, altered or changed for the purpose of using the same for flats or apartments, or whenever such frame building shall be occupied for flat or apartment purposes, each suite of apartments in such building shall be separated from every other suite of apartments in such building by a wall of incombustible material, of such dimensions and thickness as required by this chapter.

Sec. 645. *Frame Buildings—Raising—Requirements—Changing Gable or Hip Roofs to Flat Roofs.*—Permission may be granted by the Commissioner of Buildings for the raising of existing frame buildings, whether within or without the fire limits, to the limits of height hereinbefore fixed for new frame buildings, and no more. The Commissioner of Buildings is also authorized to issue permits for changing gable or hip roofs of existing frame buildings to flat roofs, and for the raising of walls incident to such change. But if such hip or gable roof is changed to a flat roof and the walls raised in connection with such change, the total cubic contents included by the walls so raised and the roofs so altered shall not exceed the cubic contents originally included in such gable or hip roofs.

Sec. 646. *Frame Buildings—Damaged—Repairing—Limitations.*—It shall not be lawful to repair or reconstruct or remove any frame building which has been injured more than fifty per cent of its original cost by wear and tear, by the effects of the elements or by fire.

Sec. 647. *Lot Lines—Requirements as to—Number—Dimensions.*—Frame buildings shall not be built nearer than one foot to any line of the lot upon which they are built, street and alley lines excepted. It shall not be lawful to erect a frame building wider than forty feet nor deeper than seventy feet, unless such building be divided by a fire wall or fire walls, built of incombustible material and of a thickness to be approved by the Commissioner of Buildings, so that no more than two thousand eight hundred square feet of super-

ficial area shall be contained in any section or part of such building, uninclosed by such fire wall. If more than one frame building is built in the direction of the depth of any one lot, such buildings shall not be built with a less distance than ten feet between them.

Sec. 648. *Chimneys in Frame Buildings—Chimney Flues Through Partitions.*—Chimneys in frame buildings shall be built of brick, or of hollow tile, with a double tile wall around the smoke duct; all joints, whether in tile or in brick chimneys shall be well filled with mortar and neatly pointed on the outside. Brick chimneys shall have flue linings of fire clay on the inside where the inclosing walls are less than eight inches thick. The wood framing of frame buildings shall be trimmed around chimneys in such manner as not to come within two inches of the same.

Metal smoke pipes or tile flues of single thickness shall not extend through the floors or through the ceiling or roof of any building; and where such smoke pipes or tile flues pass through partitions the woodwork of such partitions shall be protected either by a course of brick built all around such smoke pipes or tile flues, or by a thimble made of bright tin, the two rings thereof being at least three inches apart, with proper ventilating holes provided in the outer covering of the same on both sides of the partitions.

Sec. 649. *Frame Buildings Carried to Uniform Height.*—Frame buildings, the different parts of which are of different heights, may be carried up to a uniform height, provided the greatest height thereof does not exceed the limits of height prescribed in this chapter for frame buildings.

Sec. 650. *Basement or Story Placed Beneath Frame Buildings.*—A frame building may be raised for the purposes of erecting a basement or story, or both, thereunder, but the principal floor of such frame building shall not be raised to a higher level than sixteen feet above the sidewalk grade of the sidewalk upon which such premises abut. The walls inclosing such basement or story shall be of masonry and not less than twelve inches thick, excepting that when a one-story frame building is raised and has a basement only built thereunder the masonry wall of such basement may be eight (8) inches thick above grade and twelve (12) inches thick below. The foundations of such walls shall be constructed as provided in this chapter. Provided, however, that no frame building shall be raised for the purpose of constructing a basement or story, or both, under the same to a greater height to the top of its roof than that elsewhere herein given as the maximum height above grade for frame buildings. The thicknesses of walls hereinabove required also apply to new frame buildings.

Sec. 651. *Sheds—Frame—Requirements.*—Sheds not exceeding fourteen feet in height from the ground at the highest point thereof, and not exceeding three hundred feet in area, with an incombustible roof, may be constructed of wood within the fire limits. Such sheds shall not be located on the front part of any lot, nor shall they be used as a dwelling or as an addition to a dwelling house, or for any business purpose whatever, nor shall more than one shed be erected on any one building lot of twenty-five feet in width.

Sec. 652. *Sheds—Open Shelter—Height of Walls and Foundation—Enclosed—Inside Fire Limits.*—Amended by ordinance Nov. 25, 1907, to read as follows:

Open shelter sheds not exceeding eight hundred square feet in area may be erected within the fire limits, provided they have roofs of incombustible material and the highest point is

not over fifteen feet above the ground, and that the roofing be supported on sufficient posts or piers. Such sheds shall have no combustible enclosing walls or wooden floors, provided that a floor of two-inch planking laid directly upon the ground may be used. Such sheds shall only be erected upon the rear of the lot, and not more than one such shelter shed or any other shed shall be erected on any lot of twenty-five feet in width.

If it is desired to enclose an open shelter shed, the enclosing walls shall be made of brick, hollow tile, or other incombustible material, and such walls shall have foundations extending to solid ground and at least four feet below the surface of the ground.

Open shelter sheds may be erected outside the fire limits not to exceed twenty-eight hundred square feet in area and subject to the approval of the Commissioner of Buildings.

Sec. 653. *Sheds—Coal, Brick and Salt Sheds Along Railroad Tracks and Navigable Streams.*—Amended by ordinance of June 3, 1907, to read as follows:

That open shelter sheds to be used for the storage or handling of coal, brick or salt may be erected within the fire limits, upon, along or adjacent to steam railroad tracks or along navigable waters; provided such sheds shall have incombustible roofing and shall not exceed thirty-five feet in height from the ground to the highest point of the roofing. If it is desired or intended to enclose any such sheds, enclosing walls thereof shall be covered with incombustible material. No such coal or salt sheds shall be built upon any lot or parcel of ground fronting upon any street within seventy-five feet of any building used exclusively for residence purposes, unless the consent of the owners of the majority of the frontage on both sides of such street between the two nearest intersecting cross streets shall have first been obtained by the person or corporation desiring to erect and maintain such coal or salt sheds.

Sec. 654. *Lumber or Junk Yards—Lumber or Junk Not to Be Piled Near Residences Except by Consent.*—No person or corporation shall establish, maintain, conduct or operate any lumber yard or place at, upon or in which new or second-hand lumber is kept for sale or is stored for seasoning or drying, or where old iron or junk is kept or stored on any premises fronting on any street in any block where two-thirds of the buildings on any street bounding any such block are used exclusively for residence purposes, unless the written consent of the owners of a majority of the frontage on both sides of all the streets bounding the block in which it is proposed to locate, establish, conduct or maintain such lumber yard or place be first obtained by the person or corporation desiring to establish, maintain or operate such lumber yard or place consenting to the issuance of a license for the establishment, keeping or maintenance of such lumber yard or place; and such written consents shall accompany the application for a license made by such person or corporation.

Sec. 655. *Lumber Not to Be Piled Near Planing Mills, Woodworking Establishments or Private Residences.*—Amended by ordinance of Jan. 2, 1907, to read as follows:

No lumber shall be piled for the purpose of storage, seasoning or drying the same, within fifty feet of any planing mill or wood working manufactory, nor within one hundred feet of any private residence, unless the same has been erected since the establishment of such yard.

Sec. 656. *Grand Stands—Frame—Within the Fire Limits—Frontage Consents.*—Wooden grand stands or tiers of seats commonly known and described as grand stands, may be

erected within the fire limits where no part of any such structure shall be within sixty feet of any other building or structure, provided that the person or corporation desiring a permit for the construction of such a grand stand shall first obtain the consent in writing of the owners of a majority of the frontage on both sides of the street or streets on each side of the block or square in which it is desired to erect such grand stand.

Sec. 657. *Ice Houses.*—Amended March 19, 1906, to read as follows:

Houses to be used exclusively for the storage of ice may be constructed within the fire limits, of wood with incombustible roofing, the walls to be inclosed with an envelope of incombustible material; eight-inch brick or tile or approved cement concrete walls, with proper foundations of masonry, shall be used for such envelopes, and such houses shall be used for no other purposes than the storage of ice.

Provided, however, houses to be used exclusively for the storage of ice, may be erected and maintained contiguous with any lake, and six hundred feet from any other building, except buildings used in connection with the conduct of said business, outside of the fire limits, may be constructed of frame, with incombustible roofing, and may have a floor area of not to exceed 80,000 square feet.

Houses to be used exclusively for the storage of ice may be constructed of frame, with incombustible roofing, outside of the fire limits, of greater floor area than 80,000 square feet, provided that building is divided by a solid wall of masonry for each additional 80,000 square feet of floor area, or fractional part thereof, said wall to be approved by the Building Department, and to extend one foot beyond the enclosure of said building on each end.

Houses to be used exclusively for the storage of ice, built contiguous with railroad tracks, and not within one hundred feet of any other building, outside of the fire limits, may be constructed of frame, with incombustible roofing, with a floor area of not to exceed 5,000 square feet.

Houses to be used exclusively for the storage of ice, contiguous with railroad tracks and not within one hundred feet of any other building, outside the fire limits, may be constructed of frame, with incombustible roofing, of a larger area than 5,000 square feet, provided that building is divided by a solid wall of masonry for each additional 5,000 feet of floor area, or fractional part thereof, said wall to be approved by the Building Department, and to extend at least one foot beyond the enclosure of said building on each end.

All dividing walls must extend through and above the roof of any building in which they are built to a distance of three feet and must be covered with incombustible coping. No dividing wall shall be of less thickness than 12 inches at any point thereof.

ARTICLE XVIII.

ELEVATORS AND HOISTWAYS.

Sec. 658. *Elevators, Passenger and Freight—Permit for Construction—Fee.*—Before proceeding with the construction of any passenger or freight elevator, except such as are hereinafter specially exempted from the provisions of this chapter, there shall be obtained from the Commissioner of Buildings by the owner or agent of the building in which such elevator is to be constructed or by the contractor who is about to construct such elevator a permit for such construction, and it shall be unlawful for any such owner, agent or contractor to permit or allow the construction of any such elevator, or to proceed with, or in or about any of the work of construction

of any such elevator until such permit shall first have been obtained. Such permit shall be issued by the Commissioner of Buildings after application shall have been made to him in writing therefor by any such owner, agent or contractor, specifying the number and kind of elevators which it is desired to construct and the location of the building or structure in which the same is or are to be placed, such application shall be accompanied with such plans and specifications as may be necessary to advise and inform said Commissioner of the plan of construction, type of elevator and location thereof. If such plans and specifications shall show that such elevator or elevators is or are to be constructed or erected in conformity with the provisions of this chapter, the Commissioner shall approve the same and shall issue a permit to such applicant upon the payment by such applicant of a fee of two dollars for each elevator to be constructed and erected, and such fee shall be known as a construction fee, and shall not be held to cover the cost of any inspection which shall at any time thereafter be made of such elevator or elevators when constructed or any of the equipment thereof.

Any person, either as owner or agent of any building or structure in which any elevator or elevators is or are to be constructed, or any contractor engaged in erecting or constructing such elevator or elevators, who shall allow to be erected or constructed, or who shall attempt to erect or construct any elevator or elevators in any building or structure, without having previously obtained the permit herein required, and without having complied with the provisions of this section, shall be fined not less than fifty nor more than two hundred dollars for each offense.

Sec. 659. *Testing of Safety Devices.*—Every passenger or freight elevator hereafter constructed (except such as are hereinafter excepted from the provisions of this chapter) in any building within the city shall be provided with some efficient device to secure the safe operation of such passenger or freight elevator in its running up or down, and such device shall be subjected to such practical test as may be determined by the Commissioner of Buildings to ascertain the efficiency of such safety device to properly perform the service for which it is intended; and it shall be the duty of the Commissioner of Buildings to cause to be made such test of each and every device upon any such elevator hereafter constructed, and no such elevator hereafter constructed shall be permitted to run until the inspection herein provided for has been made and a certificate issued by the Commissioner of Buildings or such inspector that the same has been inspected, and the certificate shall be posted in a conspicuous place in such elevator. Every passenger or freight elevator now in operation within the city shall be provided with some efficient device to procure the safe operation of such passenger or freight elevator in its running up and down, and such device shall be subjected to the same test as is herein provided for elevators to be hereafter constructed, and a certificate of such inspection issued as provided for elevators to be hereafter constructed, and every such elevator now in operation within the city, or which may hereafter be constructed and operated in the city, shall be inspected under and by authority of the Commissioner of Buildings at least once every six months. Every owner or agent of any building who fails to comply with any provision of this section shall be fined not less than fifty dollars nor more than two hundred dollars for each offense, and every owner or agent of any building wherein any passenger or freight elevators are situated in the city who refuses to permit the inspection of any such elevator or who refuses to permit the making of the test in this section provided, shall be fined not less than

twenty-five dollars nor more than two hundred dollars for each and every day on which such elevator runs or is operated on and after the date of the refusal to permit inspection of such elevator or the refusal to allow such test to be made.

Sec. 600. *Safety Devices—Further.*—Every passenger or freight elevator now running or operating within the city, or which may hereafter be constructed and run and operated, shall be provided with some efficient device for the purpose of preventing the cab or car of such elevator from falling, or the securing of the safety of the cab or car and its load, in case it does fall, and all such devices that are applied to such passenger or freight elevator for the purpose of preventing such cab or car from falling or for stopping it in case it does fall shall be subjected to a practical test, such test to be made under the supervision of the Commissioner of Buildings, to determine the efficiency of such device and to secure the safety of the cab or car and its contents. Every person, whether owner or agent of any building wherein any such passenger or freight elevator within the city is now run or operated, or which may hereafter be constructed or operated, who shall fail or neglect to provide such passenger or freight elevator with such device for the purpose of preventing the cab or car from falling, or the securing of the safety of the cab or car in case it does fall, shall be fined not less than twenty-five dollars nor more than two hundred dollars for each and every day on which such elevator is run or operated without being provided with such device.

Sec. 661. *Tests—Owner Must Permit.*—Any owner or agent of any building wherein any passenger or freight elevator is run or operated within the city who desires to have a test made by and under the authority of the Commissioner of Buildings as to whether such elevator is provided with sufficient and proper safety devices shall or may notify said Commissioner of Buildings in writing that such a test is desired; and the time when such test may be made, which shall not be less than two nor more than ten days after such notice is given to the Commissioner of Buildings; and it shall be the duty of every owner or agent of any such building wherein any such passenger or freight elevator is run or operated in the city, or which may hereafter be constructed and operated, to permit the making of the test of such devices upon demand being made by the Commissioner of Buildings or by a duly authorized inspector, and every owner or agent of any such building wherein any such passenger or freight elevator is run or operated, or which may be hereafter constructed and operated, who refuses to permit the test of such devices to be made upon demand of said Commissioner of Buildings or Elevator Inspector, within five days from and after such demand is made, shall be fined not less than twenty-five dollars nor more than two hundred dollars for each and every day on which such passenger or freight elevator is run or operated after such demand for and refusal of the making of such test.

Sec. 662. *Certificate to Be Furnished and Posted.*—Whenever any such elevator shall have been inspected and the tests herein required shall have been made of all safety devices with which such elevator is required to be equipped, if the result of such inspection and tests shall show such elevator to be in good condition, satisfactory to the Commissioner of Buildings or the Inspector of Elevators, and that such safety devices have been provided, in accordance with the requirements of this chapter, and are in good working condition and in good repair, it shall be the duty of the Commissioner of Buildings or Inspector of Elevators to issue or cause to be issued, upon the payment of the inspection fee

required by the provisions of this chapter, a certificate setting forth the result of such inspection and tests, and whether such elevator and its equipment is in safe condition and in good working order. Such certificates shall be furnished to the owner or agent of the building wherein such elevator is operated, and shall be posted by such owner or agent in a conspicuous place in such elevator.

If the result of such inspection or tests shall show such elevator not to be in safe condition or not to be in a condition of good repair, or shall show that such devices, or any of them, have not been furnished, or, if furnished, are not in good working order or in a good condition of repair, such certificate shall not be issued until such elevator and its equipment or such safety device or devices shall have been put in good working order and in a good condition of repair, satisfactory to the Commissioner of Buildings or the Inspector of Elevators.

In any event, however, the inspection fees herein required shall be paid either at the time application is made for inspection or upon the completion of such inspection and tests.

Sec. 663. *Tests to Be Made Semi-annually.*—It shall be the duty of the Commissioner of Buildings to cause the tests to be made as provided for in Sections 659, 660 and 661 of this chapter of each passenger and freight elevator in the city at least once in every six months from and after the issuance of the first certificate.

Sec. 664. *Inspectors—Duties Of—Power of Commissioner to Shut Down Elevators.*—Whenever any inspector of any passenger or freight elevator finds any of the running parts or automatic devices, or other equipment out of order or in an unsafe condition he shall immediately report the same to the Commissioner of Buildings, together with a statement of all the facts relating to the condition of such elevator or elevators.

It shall be the duty of the Commissioner of Buildings, upon receiving a report from any inspector of the unsafe condition of any elevator, to order and cause such elevator to be stopped from use until the same shall have been placed in a safe condition, and any owner or agent of any building wherein any such passenger or freight elevator is run or operated within the city who permits or allows any such elevator to run after the receipt of a notice, in writing, from the Commissioner of Buildings that any such elevator is out of order, or is in an unsafe condition, shall be fined not less than twenty-five dollars nor more than two hundred dollars for each and every day on which such elevator is run or operated without being put in a safe condition or placed in good order.

Sec. 665. *Device—Efficient—To Be Approved.*—Any device which shall prove efficient for the purposes hereinbefore described in this chapter shall be approved by the Commissioner of Buildings, if, after a test by said Commissioner or any of his Elevator Inspectors, it is found that such device or devices satisfactorily performs the work it is intended should be performed by such device or devices in and by the provisions of this chapter.

Sec. 666. *Inspections to Be Made at the Same Time—One Fee.*—All certificates for and inspections of hoistways and elevators provided for in this article shall be made at the same time and the fee required to be paid by Section 668 of this chapter shall include the cost of all such inspections and issuance of such certificates.

Sec. 667. *Elevators Not Required to Be Equipped with Safety Devices.*—The provisions of this chapter requiring the

equipment of elevators with safety devices shall not apply to any elevator or elevators in any private residence not more than three stories in height, nor to any hand hoists, elevator or hoist used solely for hoisting materials or tools in any building in course of construction.

For the purposes of this section, flat or apartment buildings shall not be held to be private residences, and any elevator or elevators operated in such flat or apartment buildings shall be equipped with safety devices in accordance with the provisions of this chapter.

Sec. 668. *Inspections—Fees.*—The owners, agents or occupants of any building in which an elevator is used shall pay to the City Collector, before a certificate of inspection is issued, a fee of two dollars for each inspection of each elevator made in pursuance of the provisions of this chapter.

Sec. 669. *Certificates of Inspection—Construction—Details Of.*—When an inspector finds a hoistway, door, shaft and elevator and its equipment, including safety devices, in a sound and safe condition, he shall make and deliver to the owner, or to his agent, a certificate signed by the Commissioner, which shall contain the date of inspection, the condition of the elevator at that date, the weight it may safely carry, and a statement that the shaft, doors and all equipments, including safety devices, are constructed in a safe and proper manner and are constructed in accordance with the provisions of this chapter, which certificate shall be by the owner of the elevator framed and put in some conspicuous place in such elevator for examination by the public; provided, that the words "safe condition" in this section shall mean that it is safe for any load up to the amount of weight named in such certificate.

Sec. 670. *Hotch—Doors—Freight Elevators.*—It shall be lawful for elevators used exclusively as freight elevators to be without inclosing walls, but in all such cases there shall be at every floor through which such freight elevators pass automatic hatch closers or automatic doors, made in such manner that they will fully close each well hole when the temperature in such well hole exceeds one hundred and forty degrees Fahrenheit; and it shall be the duty of the owner, agent or person in possession, charge or control of the building in which such elevator or elevators is or are maintained to keep such hatch closers or doors at all times in good working order, and any such owner, agent or person failing to do so shall be fined not less than twenty-five dollars nor more than two hundred dollars for each offense.

Before any doors shall be considered as complying with the provisions of this section they shall be examined by the Commissioner of Buildings and the Fire Marshal, and if it be found by such officials that such doors will automatically close when the temperature at or near the same exceeds one hundred and forty degrees Fahrenheit, and that also the conditions of construction and operation of such doors or hatch closers are such that there is no reasonable probability of their getting out of order and failing to operate when required, and if there is nothing in their construction or operation that is likely to cause accidents to or interference with the elevator service in the hatch holes which they are intended to close, then, and in such case only, shall the use of such hatch closers or doors be permitted.

But such automatic hatch closers or doors shall only be permitted in cases where the building in which such freight elevator is in use shall be equipped with stairways, or stairways and passenger elevators, sufficient to afford ample means of escape from such building in case of fire for all persons employed or for all persons in such building, and in buildings

not so equipped such freight elevators shall be inclosed in fireproof walls, as hereinafter required.

Provided, that all freight elevators herein specified shall be either inclosed in fireproof walls, as hereinafter required, or equipped with automatic hatch closers or doors, as herein specified; and provided, further, that this section shall not apply to elevators in fireproof buildings.

Sec. 671. *Passenger and Freight Elevators—Inclosure Of.*—In all non-fireproof buildings all passenger elevators and all freight elevators, except such as are expressly excepted by this chapter, shall be inclosed in a wall of brick, tile or such other incombustible material as may, from time to time, be approved by the Commissioner of Buildings as proper and suitable for the purpose; such wall to extend from the foundation to the roof of such building, and when built of brick or tile to be entirely self-sustaining: provided, that where such elevator shafts are placed within walls or partitions of fireproof material surrounding such shafts in common with stairways, or in common with stairways and corridors, additional inclosures about such shafts alone shall not be required. Provided, further, however, that the provisions of this section shall not apply to any non-fireproof building which is equipped throughout on every floor and in every room thereof and in all stairways, platforms, elevator shafts, elevator hoistways and well holes with an automatic sprinkler system approved by the Fire Marshal.

Sec. 672. *Doors—On Elevators.*—In all elevator shafts which are herein required to be inclosed with fireproof walls, the openings through which ingress and egress to and from such elevators is had, shall be equipped with fireproof doors, of iron or other incombustible material, to be approved by the Building Commissioner, which shall be made to open from the inside, except that they shall also be made to open from the outside by means of a key or other device satisfactory to the said Commissioner.

Sec. 673. *Skylights—Over Elevators—Windows.*—The roof of each such passenger elevator, shaft or inclosure shall be formed by a skylight, and passenger elevators shall have a ventilator of at least one-twentieth of the area of the shaft, which shall have an operating device which shall be operative from every floor. Skylights may be omitted in shafts wherein there are windows opening on streets, alleys or courts or other vacant spaces, which will permit sufficient light and air, but such windows shall be glazed with fire-resisting glass.

The foregoing provisions relating to elevators and hoistways shall apply to buildings now existing or hereafter constructed.

Sec. 674. *Safety of Employees—Provisions For.*—Amended by ordinance Nov. 25, 1907, to read as follows:

In every building or structure under construction, where machinery is employed, the belting, shafting, gearing, elevators and every other portion of machinery, when so located as to endanger the lives and limbs of those employed therein while in the discharge of their duties, shall be, as far as possible, so covered or guarded as to make them reasonably safe and to prevent injury to such employees.

ARTICLE XIX.

FIRE ESCAPES AND STANDPIPES.

Sec. 675. *Buildings Required to Have Fire Escapes and Standpipes—Inspection—Fee.*—Amended by ordinance Nov. 25, 1907, to read as follows:

All buildings in the City of four or more stories in height, except any building used exclusively for a private residence, having two flights of stairs leading from the ground to the top floor of the building, shall be provided and equipped with one or more stairway fire escapes, as described in Section 683 of this Chapter, provided that on any building of Class VI, four stories in height, in which each occupant shall have access to at least two separate and distinct stairways from the top floor to the ground, a combination standpipe and ladder fire escape may be allowed. And provided also that buildings now in existence having a sufficient number of stairways properly located and which are now equipped with ladder fire escapes shall be exempt from the provisions of this section.

No stairway fire escapes shall be less than twenty-four inches wide and shall have wrought iron or steel balconies with suitable handrailings at each floor, or in such numbers and locations as shall be satisfactory to the Commissioner of Buildings, all firmly secured to the outside walls of the building.

All such fire escapes shall be put up and completed to conform to the buildings for which they are respectively intended, and shall be inspected after completion, and, if found to be in a perfectly safe and satisfactory condition, a certificate to that effect shall be issued by the Commissioner of Buildings to the owner, agent, or occupant of any such building, upon payment to the City Collector of a fee of two (\$2) dollars for each and every fire escape.

All fire escapes in the City shall be painted with mineral paint at least once a year.

Sec. 676. Specifications for Ladder Fire Escapes—Anchors.—All single and double fire escapes, with ladders, hereafter erected, shall be in strict accordance with the following specifications:

There shall be no less than three one-inch square wrought-iron anchors to every six-foot balcony, and six for a twelve-foot balcony. Such anchors shall pass through the wall of building and bolt on the inside with a three-fourths by two inch nut and three and one-half inch iron washer back of nut, where the wall is not over twenty inches thick; but where wall is over twenty inches thick, anchors shall be inserted at least eight inches into the wall on an angle of thirty-five degrees.

The brace of anchors shall at least be twenty inches spread, and pass into the wall four inches at bottom. No other form of anchors shall be allowed without a special permit from the Commissioner of Buildings.

Sec. 677. Balconies.—All balconies hereafter erected shall be either steel or wrought iron, capable of sustaining a weight of five hundred pounds to the square foot. The balcony frame shall be made of not less than one and one-half by three inch angle iron, securely riveted together, with crossbars every two feet, such bars to be punched one-half inch square every two inches center, and one-half inch square iron forced through the same, leaving a manhole of not less than twenty-four by twenty-four inches. The crossbars shall be securely riveted to the angle iron frame. The crossbars for a balcony twenty-eight inches wide shall be one and one-half by three-eighths inch iron. Balcony frames over twenty-eight inches wide shall be made of not less than two by three-eighths inch iron to conform with the increased dimensions of iron in crossbars; for thirty-inch balcony, two by three-eighths inch; for thirty-six inch balcony or over, two and one-half by three-eighths inch. All balconies over this width shall have a two-inch "T" iron through the center of balcony for

the bars to rest upon. Such balconies shall have a substantial cast or wrought iron post every three feet, bolted to the balcony. No balcony shall have less than two guard rails, which shall be of wrought iron, or new pipe not less than three-fourths inches in diameter, and the ends shall be anchored in the wall of building not less than ten inches on an angle of thirty-five degrees.

Sec. 678. Ladders.—The ladder, where used in combination with the standpipe, shall be bolted to such standpipe with short tapped bolts every four feet and bolted to the balconies. Rungs of ladder shall be one-half inch square iron, with the corners upward, so as to give a safe footing. Every other run shall be riveted and shall be fourteen-inch centers. Where a ladder is put up without a standpipe, the side guards shall be two by three-eighths inch flat iron or one and one-fourth inch pipe. All ladders shall be seventeen inches or more between pipes. No second-hand pipe shall be used.

Sec. 679. Standpipes Outside Buildings.—Amended by ordinance of Feb. 17, 1908, to read as follows (superseding amendatory ordinances of Oct. 22, 1906, and Nov. 25, 1907):

The standpipe shall be of the best three-inch wrought iron, seven and one-half pounds to the foot, and a two and one-half inch brass hose valve, of the City standard thread, shall be attached to the standpipe at every outlet at each floor and on the roof. The owner, agent, occupant, or person in possession, charge or control of the premises where said standpipe is located is hereby required to keep the said standpipe and hose connections oiled, free from all obstructions, in good working order, and accessible for immediate use at all times. The said standpipe and hose valves shall be inspected and tested by the Fire Department as often as once in three months, and oftener if deemed necessary by the Fire Marshal.

Sec. 680. Standpipes—Pumps—Axes, Etc.—Amended by ordinance of July 8, 1907, to read as follows (superseding amendatory ordinance of March 19, 1906):

(1) In every building over one hundred (100) feet in height not provided with a three (3) inch or larger standpipe, in all buildings hereafter constructed of a greater height than seventy-five (75) feet (except buildings used for theater purposes, as herein elsewhere provided for); in all buildings used for hospital purposes of a greater height than three (3) stories, with accommodations for at least twenty (20) patients; and in all buildings of a greater height than five (5) stories now or hereafter used for hotel or public lodging house purposes there shall be constructed one (1) or more four (4) inch standpipes, which shall extend from basement to roof and which shall be connected at street or alley side of building with two-way Siamese connection for use of Fire Department, and which shall be provided with one hose connection, with Fire Department thread, on the roof of said building, on each floor and in the basement thereof, with sufficient hose attached to reach any point thereof. The pattern, quality, installation and maintenance of such standpipe, hose and couplings, shall be subject to the approval of the Fire Marshal.

(2) In any of the buildings herein referred to where approved sprinkler systems are installed and properly maintained, it shall not be necessary to install additional inside standpipe as above provided for.

(3) On each floor and in the basement of every building used for hotel, public lodging or school purposes, three or more stories in height, there shall be two (2) or more portable hand pumps or chemical extinguishers, one or more fire axes and one or more pike poles. In the basement or janitor quarters of all apartment buildings three or more stories in

height, the floors of which are divided into two or more apartments, and in the basement of all office buildings four or more stories in height, there shall be provided one or more portable hand pumps or chemical extinguishers, one or more fire axes and one or more pike poles; all of which shall be installed and maintained subject to the approval and supervision of the Fire Marshal.

(4) The interior of all grain elevators and malt houses of a height of fifty (50) or more feet, which are not entirely fireproof, and which have a capacity of two hundred and fifty thousand (250,000) bushels or over, and the interior of all cold storage houses of a height of four (4) or more stories, which are not entirely fireproof and which have a ground floor area of ten thousand (10,000) or more square feet, shall be equipped with either a dry or wet sprinkler system, to each of which systems there shall be a feeder or riser pipe or pipes not less than four (4) inches in diameter, leading from one or more Siamese steamer connections; all of which shall be installed and maintained subject to the approval of the Fire Marshal.

(5) Grain elevators which are equipped with Journal Fire Alarm Systems of the most approved pattern and which are left at all times in the most perfect working order, or grain elevators, malt houses and cold storage houses, which are now equipped with standpipes of approved pattern and hose with not less than two (2) inch connections which have been installed in accordance with City ordinances and approved by the Fire Department, each floor of which is approved by said department as being at all times easily accessible to firemen, where fire extinguishers, water barrels and pails are distributed at intervals on all floors on advice and instruction of the Chicago Underwriters' Association; where the necessary pump pressure is maintained; where some approved electric watch service and fire alarm system is maintained and watchmen are employed during nights, Sundays and holidays, pulling such stations not less frequently than once per hour, and which have outside Siamese connections and standpipes not less than two and one-half (2½) inches, shall be exempt from the provisions of this ordinance.

Sec. 681. *Siamese*.—Amended by ordinance Feb. 17, 1908, to read as follows:

There shall be a two-way automatic Siamese at the bottom of each standpipe, so that two steam fire engines may be attached to it without interfering with each other. Such Siamese shall be within easy reaching distance from the sidewalk and be securely anchored to the wall of the building. The owner, agent, occupant, or person in possession, charge or control of the premises where such standpipe and Siamese are located, is hereby required to provide such covering or protection to the fittings of said Siamese steam engine connection for the purpose of keeping said fittings and connection clear and unobstructed as shall be ordered and required by the Fire Marshal. The protection or covering herein referred to shall apply to all standpipes located inside of buildings, as well as outside of buildings, and include connections to automatic sprinkler equipment.

Sec. 682. *Anchors for Top of Standpipe—Painting*.—All the anchors for the top of standpipe and ladders shall pass through the wall and bolt on the inside of same.

All work shall be painted with two coats of the best mineral paint, and all holes shall be filled up with the best cement.

Sec. 683. *Stairway Fire Escapes—Erection Of—Location—Component Parts*.—The Commissioner of Buildings or Inspectors shall determine upon the location of all stair fire escapes before erection of same is commenced.

A permit shall be obtained from the Department of Buildings before work is commenced, which permit will be issued on payment to the city collector of a fee of two (\$2) dollars.

No permit for a stairway fire escape projecting three feet or more from the face of the wall shall be granted unless a detailed plan for the fire escape, approved by a licensed architect or practicing structural engineer, is submitted to the Commissioner of Buildings, and a copy of such plans shall be left on file with said commissioner.

Anchors.—All anchors for stairway fire escapes shall, wherever possible, pass through the wall of building and be secured on inside of same. Where it is impossible to anchor through walls, anchors shall be put in wall not less than fifteen inches at an angle of thirty-five degrees. On buildings of steel construction, where walls are less than twenty inches in thickness, there shall be steel channels at least four inches wide set on inside of building from column to column and bolted or riveted to columns, and anchors shall be bolted on inside of channels.

Anchors for a platform four feet two inches or less in width shall be made of one-inch square iron; over four feet two inches and not over six feet, shall be one and one-fourth inch square iron, with brace; over six feet, shall be one and one-half inch square iron, with brace. All anchors shall be turned up not less than six inches at the outside of platform to bolt post to.

Braces.—Braces shall be the same thickness as the anchors. Spread of braces shall be the width of platform. Where the platforms are over five feet in width anchors shall have double braces, one to the outside and one to the center of platform.

Platforms.—Platforms shall be not less than fifty inches wide at ends; passageways shall be not less than twenty-four inches between building and railings. Platforms shall be not less than twelve feet in length. The frames and crossbars shall be made as specified by Section 677 of this chapter. Platforms shall have clips at each end bolted to anchors. No door or window or shutter shall open so as to obstruct in any way the free passage on or along a platform or a staircase or ladder fire escape.

Stairs.—All fire escape stairs for apartment buildings, hotels, boarding houses, factories and office buildings, where there are less than one hundred people, shall be not less than two feet wide between railings and stringers. Where there are more than one hundred people, stairs shall be three feet wide. All stairs for halls, churches, theaters, hospitals, schools, department stores and buildings where large numbers of people congregate shall be not less than three feet wide in the clear, and all passageways shall be not less than three feet wide in the clear; stringers shall be made of two bars three by five-sixteenths inch, about one inch apart, or four and one-half by three-eighths inch flat iron. Where over twelve feet in length, they shall have anchor and brace in center. The treads shall be made of one-half inch square steel or iron, corner upwards not to exceed one and five-eighths inches center, riveted at ends to two by five-sixteenths inch flat iron or steel. There shall be not less than four bars to a tread, where treads are less than twenty-seven inches in length; where treads are over twenty-seven inches in length, there shall be not less than six bars to a tread; then, there shall be a truss supporting treads made of bar iron two inches by three-eighths of an inch, riveted to bars of treads in center, supported by two seven-sixteenth inch rods bolted at each end of treads. All stairs shall have an incline of about forty-five degrees; rise of treads shall be not less than seven inches and not more than ten inches.

Railings.—All stairs shall have three bar railings made of one-inch bar iron for top rail and three-quarter inch bar iron for lower rail, and when such stairs are more than three inches from wall of building, then there shall be one or more hand rails on the wall side of such stairs.

Posts.—All posts used for stair fire escapes shall be made of one and one-half inch angle or channel iron not less than three feet six inches high, and shall have braces on outside turned upwards and fastened to frame of balcony or stairs and not less than half way up the post; all stair fire escapes shall extend to the ground, either by counterbalance or drop stairs. Cables for counterbalance stairs shall be not less than three-quarters inch in size, and shall be well oiled or greased when hung up, and oiled or greased at least once a year. All pulleys and cables holding counterbalance shall be covered at bracket, so as to protect it from snow and ice.

Painting.—All stair fire escapes shall be painted with two coats of paint, one at the shop and one after completion at the building.

Where it is impossible to erect stair fire escapes according to these specifications, then plans shall be submitted to the Commissioner of Buildings or Inspectors for approval.

All such fire escapes shall, on completion, be inspected by the Inspectors, and if found safe and satisfactory, a certificate will be issued upon payment of one (\$1) dollar to the city collector.

As amended Nov. 25, 1907 (substituting the word "Inspectors" for the words "Fire Escape Inspectors," wherever they occur).

Sec. 684. *Fire Escapes in General.*—No fire escape of any kind shall be constructed except upon a permit therefor issued by the Commissioner of Buildings upon the payment by the applicant therefor to the city collector of a permit fee of two dollars.

Every building in the city required by law to be equipped with metallic standpipes and wrought iron or steel balconies, or other fire escape devices, shall have displayed in conspicuous places, on each floor of such building, notices sufficient in number and in plainly legible type at least six inches in height, indicating and showing the location of such metallic ladders, balconies and fire escapes and the easiest way to reach them. If such notices be not displayed within thirty days after such equipment and kept continuously displayed, said commissioner is authorized to take such action as may be necessary to have such building closed.

Sec. 685. *Penalty.*—Any owner, agent or person in possession, charge or control of any such building, who violates, disobeys, omits or neglects to comply with the terms of the foregoing section, shall be fined not less than five dollars nor more than fifty dollars for each offense, and every such owner, agent or person shall be deemed guilty of a separate offense for every day such violation, disobedience, omission or neglect shall continue, and shall be subject to the penalty imposed hereby for each and every such separate offense.

Where stair fire escapes pass windows or doors, the windows or doors shall be of fire-resisting glass and have metal frames and sash, or such fire escapes shall be hooded with metal for at least two feet each side of such opening.

ARTICLE XX.

FIRE LIMITS.

As defined by ordinance passed March 29, 1909.

Sec. 686. *Fire Limits of City.*—The fire limits of the City of Chicago shall be and are hereby defined as follows: All

that part of the City of Chicago bounded by the following limits. Commencing at the intersection of the shore of Lake Michigan and a line one hundred and fifty feet north of the center of Belmont avenue, thence west on said first mentioned line to the center line of North Halsted street, thence south along said center line of North Halsted street to the center line of Fullerton avenue, thence west along said center line of Fullerton avenue to the center of the North Branch of the Chicago River, thence northwesterly along the center of said North Branch of the Chicago River to the center line of Belmont avenue, thence west along said center line of Belmont avenue to the center line of Kedzie avenue, thence south along said center line of Kedzie avenue to the center line of West North avenue, thence west along said center line of West North avenue to the center line of North Fortieth avenue, thence south along said center line of North Fortieth avenue to the center line of the first alley north of Park avenue, thence west along the center line of said alley to the center line of South Forty-sixth avenue, thence south along said center line of South Forty-sixth avenue to the center line of West Madison street, thence west along the center line of West Madison street to the center line of South Forty-eighth avenue, thence north along said center line of South Forty-eighth avenue to the center line of Kinzie street, thence west along said center line of Kinzie street to the center line of South Fifty-second avenue, thence south along said center line of South Fifty-second avenue to the center line of West Madison street, thence east along said center line of West Madison street to the center line of South Fiftieth avenue, thence south along said center line of South Fiftieth avenue to the north line of the present right of way of the Chicago & Great Western Railroad Company, thence east along the said north line of said right of way to the center line of South Forty-eighth avenue, thence south along the said center line of South Forty-eighth avenue to the center line of West Twelfth street, thence east along said center line of West Twelfth street to the center line of South Forty-sixth avenue, thence south along said center line of South Forty-sixth avenue to the center line of West Twenty-second street, thence east along said center line of West Twenty-second street to the center line of South Fortieth avenue; thence south along said center line of South Fortieth avenue to the center line of the Illinois and Michigan Canal, thence northeasterly along the center line of the said canal to the center line of South Western avenue; thence south along said center line of South Western avenue to the center line of West Thirty-ninth street, thence east along said center line of West Thirty-ninth street to the center line of State street, thence south along said center line of State street to the north line of West Forty-seventh street, thence west along said north line of West Forty-seventh street to a line seventy-five feet west of the west line of South Halsted street, thence south to a line seventy-five feet north of the west line of South Halsted street along said line seventy-five feet west of the north line of West Sixty-third street, thence west along said line seventy-five feet north of the north line of West Sixty-third street to the center line of South Ashland avenue, thence south along the center line of South Ashland avenue to the center line of West Sixty-third street, thence east along said center line of West Sixty-third street to the center line of State street, thence south along said center line of State street to the center line of East Seventy-fifth street, thence east along said center line of East Seventy-fifth street to the center line of Colfax avenue, thence south along the center line of Colfax avenue to the center line of Seventy-ninth street, thence east

along the center line of Seventy-ninth street to the shore of Lake Michigan, thence northerly and northwesterly along the shore of Lake Michigan to the place of beginning.

Also, commencing at a point in the center of Manistee avenue, where it intersects the right of way of the main line of the Lake Shore & Michigan Southern Railroad; thence northeasterly and north along the center line of Manistee avenue to the center line of Eighty-ninth street, thence east along the center line of Eighty-ninth street to the center line of Mackinaw avenue, thence south along the center line of Mackinaw avenue to the center line of Harbor avenue, thence southwesterly along the center line of Harbor avenue to the center line of Ninety-third street; thence west along the center line of Ninety-third street to the easterly line of the Baltimore & Ohio Railroad right of way; thence south along the easterly line of the Baltimore & Ohio Railroad right of way and Baltimore & Ohio Railroad extended, to the northeasterly line of said Lake Shore & Michigan Southern Railroad; thence northwesterly along the northeasterly line of said right of way to the place of beginning.

As defined by ordinance passed March 29, 1909.

Also, commencing at the east line of Jackson Park avenue and the south line of the Pittsburg, Ft. Wayne & Chicago Railroad Company's right of way, and running southeasterly along the right of way along the Pittsburg, Ft. Wayne & Chicago Railroad Company's right of way to the north line of Eighty-third street, thence west along the north line of Eighty-third street to Jackson Park avenue, thence north along the east line of Jackson Park avenue to the place of beginning.

Sec. 687. *Fire Limits—Provisional.*—Provided, however, that any person desiring to erect a frame or wooden building, to be used for residence or mercantile purposes within that portion of the territory bounded on the east, between Sixty-seventh and Seventy-fifth streets, by Lake Michigan, on the south by the center line of Seventy-fifth street, on the west by the center line of State street to the intersection of Sixty-third street, thence east along the center line of Sixty-third street to the intersection of Cottage Grove avenue, thence south along the center line of Cottage Grove avenue to the intersection of Sixty-seventh street, thence east along the center line of Sixty-seventh street to Lake Michigan, shall have a right to do so, upon presenting a petition to the Commissioner of Buildings, together with a plat, plans and specifications showing the place where such building is to be erected. Such petition shall be verified by the affidavit of the applicant and shall contain the written consent of the owners of a majority of the frontage upon each side of the streets or alleys in the block or square in which the building is to be erected.

No frame or wooden residence or mercantile building shall be erected within the said provisional fire limits exceeding forty feet in height unless the basement story shall be constructed of brick or stone, in which case the height shall not exceed forty-five feet above the sidewalk.

Sec. 688. *Fire Limits—Exception From.*—There shall be excepted from the fire limits as hereinbefore defined, the territory bounded as follows:

Commencing at the intersection of a line seventy-five feet west of the west line of State street and a line seventy-five feet south of the south line of Forty-seventh street, thence west along said line seventy-five feet south of the south line of Forty-seventh street to a line seventy-five feet east of the east line of Wentworth avenue, thence south along said line seventy-five feet east of the east line of Wentworth avenue

to a line seventy-five feet north of the north line of Sixty-third street to a line seventy-five feet west of the west line of State street, thence north along said line seventy-five feet west of the west line of State street to the place of beginning.

Also that territory within the lines beginning at the intersection of a line seventy-five feet west of the west line of Wentworth avenue, and a line seventy-five feet south of the south line of Forty-seventh street; thence west along said line seventy-five feet south of the south line of Forty-seventh street to a line seventy-five feet east of the east line of South Halsted street; thence south along said line seventy-five feet north of the north line of South Halsted street to a line seventy-five feet north of the north line of Sixty-third street; thence east along said line seventy-five feet north of the north line of Sixty-third street to a line seventy-five feet west of the west line of Wentworth avenue; thence north along said line seventy-five feet west of the west line of Wentworth avenue to the place of beginning.

As amended by ordinance of Feb. 26, 1906.

ARTICLE XXI.

FRONTAGE CONSENTS.

Sec. 689. *Definition of Word "Block," as Used in This Chapter.*—Whenever in this chapter a provision is made that frontage consents shall be obtained for the erection, construction, alteration, enlargement or maintenance of any building or structure in any block, the word "block," so used, shall not be held to mean a square, but shall be held to embrace only that part of a street bounding the square which lies between the two nearest intersecting streets, one on either side of the point at which such building or structure is to be erected, constructed, altered, enlarged or maintained, unless it shall be otherwise specifically provided.

Sec. 690. *Hospitals—Permits—Special Consents—Height Of.*—It shall be unlawful for any person or corporation to build, construct, maintain, conduct or manage in any block, if two-thirds of the buildings fronting upon both sides of the streets bounding such block or square are devoted exclusively to residence purposes, any hospital for the care, treatment or nursing of three or more insane persons; or any hospital for the care, treatment or nursing of three or more inebriates, or persons suffering from the effects of the excessive use of alcoholic liquors; or any hospital for the care, treatment or nursing of three or more epileptics; or any hospital for the care, treatment or nursing of three or more persons addicted to, or suffering from, the excessive use of morphine, cocaine or other similar drugs or narcotics; or any hospital for the care, treatment or nursing of any person or persons affected with any infectious or contagious disease, unless the owners of a majority of the frontage in such block and in addition thereto the owners of a majority of the frontage on the opposite sides of the streets bounding such block consent in writing to the building, constructing or maintaining, managing or conducting of any such hospital in such block. Such written consents of the majorities of such property owners shall be filed with the Commissioner of Buildings, and an exact copy of same shall be filed with the Commissioner of Health before a permit shall be granted for the building or constructing or a license issued for the maintaining, conducting or managing of any such hospital. Provided, that any such building that may be used for such purposes as set forth in this section and which is over two stories in height shall be of fireproof construction throughout,

and no hospital shall be built to exceed six stories in height. (Repealed. See note at bottom of page.)

Sec. 691. *Hospitals—Location of Near School Houses.*—Amended by ordinance March 4, 1907, to read as follows:

No hospital of any kind or description hereafter erected or established shall be erected or established on any lot or parcel of ground any part of which is located within four hundred feet by the nearest traveled route of any property used for school purposes. (Repealed. See note at bottom of page.)

Sec. 692. Amended July 13, 1908, to read as follows:

It shall not be lawful for any person or corporation to locate, build, construct or maintain on any street or alley in the city any building or place used for junk shop or junk yard without the written consent of a majority of the property owners in the block in which said junk shop or junk yard is sought to be located, built, constructed or maintained according to the frontage on both sides of such street or alley; nor for any person or corporation to locate, build, construct or maintain on any street or alley in the city in any block in which two-thirds of the buildings on both sides of the street are used exclusively for residence purposes any building or place used for gas reservoir, packing house, rendering plant, soap factory, tannery, boarding, livery or sale stable, blacksmith shop, foundry, brewery or distillery, grain elevator, or laundry to be run by machinery, or machine shop, without the written consent of a majority of the property owners according to the frontage on both sides of such street or alley.

Such written consent shall be obtained and filed with the Commissioner of Buildings before a permit is issued for the construction of any such building or place: provided, that in determining whether two-thirds of the buildings on both sides of the street are used exclusively for residence purposes any building fronting upon another street and located upon a corner lot shall not be considered.

Under amendments, see also ordinance requiring frontage consents for buildings used for theatrical or dramatic entertainments, etc., together with an ordinance prohibiting such buildings nearer than 200 feet of a church or educational building.

Sec. 693. *Reformatories—Sheltering Institutions.*—It shall be unlawful for any person or corporation to build, construct, maintain, conduct or manage any reformatory, rescue or sheltering institution in any block or square in which two-thirds of the buildings on both sides of the street or streets on which the proposed reformatory, rescue or sheltering institution may front are used exclusively for residence purposes, without the written consent of a majority of the property owners, according to frontage, on both sides of the streets bounding such block.

Such written consent shall be obtained and filed with the Commissioner of Buildings before a permit is issued for the construction or keeping of such building.

Provided, that in determining whether two-thirds of the buildings on both sides of the street are used exclusively for residence purposes, any building fronting upon another street and located upon a corner lot shall not be considered.

Sec. 694. *Permits for Moving Frame Buildings—Requirements—Written Consents Must Be Obtained—Affidavits Made.*

NOTE.—See also ordinance amending Sec. 691 as to Blacksmith Shops, under "Amendments," on page 203.

NOTE.—Sections 690 and 691 together with 279, repealed by ordinance governing Hospitals, passed June 1, 1908, page 504 of seq., Council Proceedings.

—Permits to move frame buildings shall be granted, if any such frame building has not been damaged to an extent greater than fifty per cent of its original cost, by fire, wear and tear, the action of the elements or otherwise. Any person desiring to remove a frame building shall first obtain the written consent to such removal from persons owning a majority of the frontage of the lots on both sides of the street in the same block to which the building is to be removed.

As amended by ordinance of June 5, 1906.

This section shall not apply to the case of any person removing a building upon his own premises and not going upon the premises of any other person, or upon any street, alley or other public place, in making such removal.

Provided, however, that no permit shall be issued for the removal of any frame building from any point outside the fire limits to any point within the fire limits, when such building is of such a character that it would not be lawful to build it within the fire limits.

ARTICLE XXII.

USE AND OBSTRUCTION OF STREETS FOR BUILDING PURPOSES.

Sec. 695. *Sidewalk and Street—Occupation Of—Limitations.*—The extent of occupation of sidewalk and street to be covered by the terms of a permit for street obstruction or building shall be as follows:

Such permit shall not authorize the occupation of any sidewalk or street or part thereof other than that immediately in front of the lot or lots upon which any building is in process of erection and in relation to which such permit is issued.

During the progress of building operations a sidewalk not less than four (4) feet in width shall be at all times kept open and unobstructed for the purpose of passage in front of such lot or lots. Such sidewalk shall, if there are excavations on either side of the same, be protected by substantial railings which shall be built and maintained thereon so long as such excavations continue to exist. It is not intended hereby to prohibit the maintenance of a driveway for the delivery of material across such sidewalk from the curb line to the building site.

Sec. 696. *Sidewalks—Delivery of Material—Elevated Sidewalks.*—It shall be permitted for the purposes of delivering material to the basements of buildings in process of erection to erect elevated temporary sidewalks to a height of not exceeding four feet above the curb level of the street; and in case a sidewalk is so elevated, it shall be provided with good, substantial steps or easy inclines on both ends of the same and shall have railings on both sides thereof.

Sec. 697. *Sidewalks—Temporary Roof Over—Time Maintained.*—If the building to be erected is more than four stories in height, and is set at or near the street line, there shall be built over the adjoining sidewalk a roof having a framework and covering composed of supports and stringers of three by twelve timbers, not more than four feet from centers, covered by two layers of two-inch plank.

Such roof shall be maintained as long as material is being used or handled on such street front and above the level of such sidewalk.

In all cases such temporary sidewalks and their railings and approaches, and the roofs over the same, shall be made, as regards ease of approach, strength and safety, to the satisfaction of the Commissioner of Buildings.

Sec. 698. *Street—Storage of Building Materials—Limitations.*—The occupation of the street for the storage of building materials, or for temporary sidewalks, shall never exceed, in front of any one building, one-third of the width of the roadway of the same, and in no event shall any material be stored or placed within four feet of any street or steam railway track.

Sec. 699. *Sidewalks and Street—Excavated Material and Rubbish On—How Cared For.*—Earth, other than sand to be used in the construction of the building, taken from excavations, and rubbish taken from buildings shall not be stored either upon sidewalks or roadways of streets, and shall be removed therefrom from day to day as rapidly as produced. When dry rubbish, apt to produce dust, is being handled, it shall be kept wetted down so as to prevent its being blown about by the wind.

Sec. 700. *Derricks—Limitations.*—For all buildings more than four stories in height, the use of derricks set upon the sidewalk of street is prohibited. In no case shall the guy lines be less than fifteen feet above the roadbed.

Sec. 701. *Frontage Adjacent—How Occupied for Building Purposes.*—If the written consent and a waiver of claims for damages against the city of the owners of properties abutting upon the site of any proposed building is first obtained and filed with the Commissioner of Public Works, the permission to occupy the roadway and the sidewalk may be extended beyond the limits of such building in front of the property for which the consent of the owner or lessee thereof has been secured, upon the same terms and conditions as those herein fixed for the occupation of sidewalk and street in front of the building site.

Sec. 702. *Street, Use of, for Building Purposes—When Terminated.*—Streets and sidewalks may be occupied for the purposes of building only in connection with the actual erection, repair, alteration or removal of buildings, and permission for such occupancy shall terminate with the completion of such operation. It shall be unlawful to occupy any sidewalk or street after the completion of the operation for which a permit has been issued by the Department of Buildings. It shall also be unlawful to occupy a sidewalk or street, under authority of such permit, for the storage of articles not intended for immediate use in connection with the operations for which such permit has been issued.

Sec. 703. *Red Lights.*—Red lanterns shall be displayed and maintained during the whole of every night at each end of every pile of material in any street or alley and at each end of every excavation.

Sec. 704. *Street Obstructions—Permits—Bonds—Fees.*—Permits for the obstruction of streets shall be issued by the Commissioner of Public Works and shall be paid for, in proportion to the street frontage occupied, at the rate of two dollars per month for each twenty-five feet of frontage so occupied.

No permit shall be issued until the applicant therefor shall have executed and filed with the Commissioner of Public Works a bond, with sureties to be approved by said Commissioner, and in an amount to be designated by him (in no case to be less than ten thousand dollars), conditioned to indemnify, save and keep harmless the city from any and all loss, cost, expense or liability of any kind whatsoever which it, the city, may suffer or be put to or which may be recovered from it from or by reason of the issuance of such permit, or by reason of any act or thing done under or by virtue of the authority given in such permit.

ARTICLE XXIII.

BILLBOARDS AND SIGNS.

This entire article amended by ordinance of January 2, 1907, together with a new section, to be known as Section 706a, added.

Sec. 705. *Billboards or Signboards on Buildings.*—Every billboard of greater height than two feet and placed on any building shall be faced with iron or other incombustible material with framework of wood or iron, and shall be securely anchored and fastened to such building in such manner as to make the same safe, to the satisfaction and approval of the Commissioner of Buildings. When such billboard or signboard is situated above or upon the roof of any building the supports and framework for same may be of wood, and the number of such supports and the construction of same and the construction of the framework for same shall be satisfactory to and approved by the said Commissioner.

No billboard or signboard anchored to, fastened to, or situated above or upon the roof of any building shall be placed so that the face of same shall come within three feet of the inner plane of the outer wall of such building, nor shall the same be constructed so that the bottom of such billboard or signboard shall be less than one foot or more than three feet above the surface of such roof; the face of such billboard or signboard shall not exceed ten feet in height, nor shall it exceed twenty-four feet in length for every twenty-five feet of frontage on the building on which it is placed, nor extend beyond the wall of said building; and such billboard or signboard shall have a door in the center of same which can be readily opened and which when so opened will leave a clear space at least four feet in width and seven feet in height from the roof to the top of said door.

No billboard or signboard shall be anchored to, fastened to or situated above or upon the roof of any building more than two (2) stories in height; and no billboard or signboard shall be anchored to, fastened to or situated above or upon the roof of any building having other than a flat roof.

No billboard or signboard such as is described in this section, whether anchored to or fastened to any building or situated or located upon the roof thereof, shall be constructed and put in place unless in accordance with plans and specifications which have been submitted to and approved by the Commissioner of Buildings.

Sec. 706. *Size and Construction of Billboards and Signboards Erected Within Fire Limits Otherwise Than on Buildings.*—No billboards or signboards erected within the fire limits as now defined or as they may hereafter be defined by ordinances of the city (other than signboards and billboards referred to in Sections 705 and 707 hereof) shall exceed twelve (12) feet in height, and the same shall be constructed of tin or galvanized iron or some other equally incombustible material, except that the stringers, uprights and braces thereof may be made of wood. All such billboards or signboards shall be securely anchored or fastened so as to be safe and substantial.

Sec. 706a. *Height and Distance From Ground of Billboard or Signboard Erected Within Fire Limits.*—No billboard or signboard (other than those referred to in Sections 705 and 707 hereof) shall be constructed within the fire limits at a greater height than seventeen feet above the level of the adjoining street, and the base of the billboard or signboard shall be in all cases at least five feet above the level of the adjoining street, and in case the surface of the ground upon which

such billboard or signboard is erected is above the grade of the adjoining street, the base of such billboard or signboard shall be not less than two feet above the surface of the ground. In case the grade of the adjoining street or streets has not been established, no such billboard or signboard shall be constructed at a greater height than seventeen feet above the level of the street adjoining the ground upon which such billboard or signboard is erected.

Sec. 707. *Wooden Billboards or Signboards—Construction—Size—Exceptions*.—Billboards or signboards not exceeding twelve square feet in area may be built of wood or other combustible material, and such billboards or signboards shall be exempt from the provisions of this article. Signs erected flat against the face of buildings shall also be exempt from the provisions of this Article, provided that such signs shall be safely and securely fastened to the building.

Sec. 708. *Billboards or Signboards Erected Outside of the Fire Limits—Construction—Size*.—All billboards or signboards erected outside of the fire limits as now defined or as they may hereafter be defined by the ordinances of the city (other than those referred to in Sections 705 and 707 hereof) shall comply with the following conditions:

If such billboard or signboard be erected or located so that no part thereof is nearer than ten feet to any building, wooden fence, or other structure, such billboard or signboard may be constructed of wood or other combustible material, but no part of same shall exceed seventeen feet in height, and the same shall be so constructed that there shall be a clear space of not less than five feet between the bottom of such billboard or signboard and the surface of the ground upon which such billboard or signboard is erected. If any part of such billboard or signboard shall be within ten feet of any building, wooden fence, or other structure, the size and construction of such billboard or signboard shall be limited as is provided in Sections 706 and 706a for billboards or signboards erected within the fire limits. All billboards or signboards erected outside of the fire limits as provided for in this section shall be securely anchored or fastened so as to be safe and substantial.

Sec. 709. *No billboard or Signboard Shall Be Erected Without Permit*.—No billboard or signboard such as is described in this article shall be erected or maintained within the City unless a permit shall first have been secured by the person desiring to erect or maintain such billboard or signboard from the Commissioner of Buildings, to whom application for such permit shall be made; and such application shall be accompanied by such plans and specifications of the proposed billboard or signboard as are necessary to fully advise and acquaint the said Commissioner with the construction of such proposed billboard or signboard. If the plans and specifications accompanying such application shall be in accordance with the provisions of this article, said Commissioner shall thereupon issue a permit for the erection of such billboard or signboard, upon the payment by the applicant of a fee as hereinafter fixed; provided, however, that none of the provisions of this article shall apply to or affect any billboard erected upon land abutting the right-of-way of any railroad where such billboard does not come within twenty-five feet of any public highway and where the bottom of such billboard is not less than three feet from the ground and the same is situated more than fifty feet from any building.

Sec. 710. *Alteration and Repair of Billboards and Signboards*.—No material alteration of any billboard or signboard shall be made except upon a written permit issued by the

Commissioner of Buildings authorizing such alteration; and such permit shall be issued upon application in writing made to such Commissioner by the owner of such billboard or signboard or by the person in charge, possession, or control thereof, accompanied by a plan or statement of the proposed alterations to be made; which, if satisfactory to and approved by the Commissioner of Buildings, shall authorize such applicant to receive a permit upon the payment of a fee therefor as hereinafter fixed; but such alteration shall not be construed to apply to the changing of any advertising matter of any billboard or signboard, nor the refacing of the framework supporting same.

Sec. 711. *Billboards Now Existing to be Altered to Comply with the Provisions of this Article*.—Every now existing billboard or signboard, whether erected upon or above the roof of any building or attached or fastened to the wall or walls of any building, or standing upon or erected upon any lot or premises, which is now erected or which is now maintained contrary to the provisions of this article, shall be forthwith removed or altered, changed, or cut down so as to fully comply with such provisions; and any billboard or signboard now existing and not complying with the provisions of this article which shall not have been removed or torn down or so altered and changed within nine months from and after the passage of this ordinance as to be brought into conformity with the provisions of this article by the owner thereof or by the person in charge, possession, or control thereof, shall be torn down by the Commissioner of Buildings and the cost and expense of tearing down such billboard or signboard shall be charged to the owner of such billboard or signboard or the person in charge, possession, or control thereof, and shall be recovered from such person for the use of the city by any appropriate proceeding therefor.

Sec. 712. *Duty of Commissioner—Owner's Name to be Placed on Top of Billboard*.—It shall be the duty of the Commissioner of Buildings to inspect all plans and specifications submitted in connection with the erection or construction or the alteration or repair of any billboard or signboard and to approve same if the method of construction and provisions made for fastening, securing, anchoring and maintaining such billboards or signboards are such as will serve to protect the public and to render such billboards or signboards safe and substantial. It is further made the duty of the Commissioner of Buildings to exercise a supervision over all billboards and signboards erected or being maintained under the provisions of this article; and whenever it shall appear to said Commissioner that any such billboard or signboard has been erected in violation of this ordinance or is in an unsafe condition or has become unstable or insecure or in such a condition as to be a menace to the safety of the public, he shall thereupon issue or cause to be issued a notice in writing to the owner of such billboard or signboard or the person in charge, possession or control thereof, if the whereabouts of such person is known, informing such person of the violation of this ordinance and the condition of such billboard or signboard and directing him to make such alterations or repairs thereto or to do such acts or things as are necessary or advisable to place such billboard or signboard in a safe, substantial and secure condition, within such reasonable time as may be stated in said notice. If the person so notified shall refuse, fail, or neglect to comply with and conform to the requirements of such notice, said Commissioner shall, upon the expiration of the time therein mentioned, tear down or cause to be torn down such billboard or signboard, and shall charge the expense of such tearing down to the person so notified.

If the owner of such billboard or signboard or the person in charge, possession, or control thereof cannot be found or his whereabouts is not easily ascertainable, the Commissioner shall attach or cause to be attached to such billboard or signboard a notice of the same import as that required to be sent to the owner where such owner is known; and if such billboard or signboard shall not have been made to conform to this ordinance and placed in a secure, safe, and substantial condition, in accordance with the requirements of such notice, within thirty days after such notice shall have been attached to such billboard or signboard, it shall be the duty of the Commissioner of Buildings to thereupon order such billboard or signboard torn down; provided that nothing herein contained shall prevent the Commissioner of Buildings from adopting such precautionary measures as may be necessary or advisable in case of imminent danger in order to place such billboard or signboard in a safe condition, the expense of which may be charged to and recovered from the owner of same in any appropriate proceeding therefor. No permit shall be issued to any applicant for permission to erect a billboard or signboard unless such applicant shall agree to place and maintain on the top of such billboard or signboard the name of the person or corporation owning same or who is in charge, possession, or control thereof. It shall be the duty of the Commissioner of Buildings to see to it that the name of the person or corporation owning or in possession, charge, or control of such billboard or signboard is placed upon such billboard or signboard forthwith upon the erection thereof and is kept thereon at all times while such billboard or signboard is maintained; and in case the owner of such billboard or signboard or the person in charge, possession, or control thereof shall fail or refuse to place and maintain such name on the same after due notice from the Commissioner of Buildings he shall be subject to the penalty hereinafter provided for.

Sec. 713. *Fees for Permits—Indemnifying Bond.*—Amended by ordinance Dec. 2, 1907, to read as follows:

The fee to be charged for permits issued for the erection or construction of billboards or signboards or for the alteration thereof shall be two dollars for each twenty-five lineal feet of billboard or signboard so erected.

Any person, firm or corporation engaged in the business of erecting billboards or signboards within the City limits for the purpose of display advertising shall file with the City Clerk of the City of Chicago an approved bond in the sum of twenty-five thousand (\$25,000) dollars to indemnify the City against any lawsuits brought or judgment obtained against the City of Chicago, or any of its officials, resulting from accidents by such billboards or signboards.

Sec. 714. *Penalty.*—Any person or corporation owning, operating, maintaining, or in charge, possession, or control of any billboard or signboard within the City, who shall neglect or refuse to comply with the provisions of this article, or who erects, constructs or maintains any billboard or signboard that does not comply with the provisions of this article, shall be fined not less than twenty-five dollars nor more than two hundred dollars for each offense; and each day on which any such person shall permit or allow any billboard or signboard owned, operated, maintained or controlled by him, to be erected, constructed, or maintained in violation of any of the provisions of this article, shall constitute a separate and distinct offense.

Sec. 715. *Fences—Height Of.*—No wooden fences shall be constructed of greater height than eight feet above the sidewalk grade or eight feet above the surface of the ground where no grade is established.

ARTICLE XXIV.

STORAGE OF OILS.

Sec. 716. *Storage of Oils—Buildings for Storage of Oils—Walls—Roof—Floor.*—Buildings designed for the storage of crude petroleum, gasoline, naphtha, benzine, camphine, carbon oil, spirit gas, burning fluid, spirits of turpentine or coal, rock or earth oils (excepting such refined oils as will stand a fire test of one hundred and fifty degrees Fahrenheit according to the method and direction of John Tagliabue), shall be constructed as follows:

The walls shall be of brick, stone, or concrete, and shall be not less than sixteen inches thick or more than sixteen feet high. The lower floor of such buildings shall be at least three feet below the grade of the adjoining street and shall be made of earth, concrete or brick. The roof of such buildings shall be made of tile, metal or other incombustible material, and the outside walls of any such building having a flat roof shall extend at least eighteen inches above the roof. The coping upon the roof of such buildings shall be made of incombustible material. Such buildings shall be detached from all other buildings and shall be properly ventilated. Where any such building shall be located less than twenty-five feet away from any other building or structure, the wall or walls of such building on the side or sides thereof, within such distance of twenty-five feet from any other building or structure shall have no window or other opening therein; provided, however, that if such building cannot be so constructed that no outside wall thereof shall be less than twenty-five feet away from any other building or structure, in such case, openings may be made in the wall of such building which is located farthest away from any other building or structure for the purpose of admitting light or providing means of access thereto or egress therefrom. If such opening be a window, the glass in such window shall be fire-resisting glass, and such window shall be provided with a steel shutter.

No such building shall be occupied for any purpose other than the storage of oils, and no person shall be permitted to use any such building as a sleeping apartment or dwelling place.

The interior cubic capacity of any such building shall exceed by at least twenty-five per cent the total capacity of the tanks or other receptacles placed in such building.

Such buildings and the equipment thereof, including the protection of the doors and windows, shall be constructed according to plans and specifications which have been submitted to and approved by the Commissioner of Buildings.

Sec. 717. *Tanks for Storage of Oils.*—Tanks for the storage of any one or more of the oils or fluids mentioned in the preceding section may be built outside of buildings either above or under the surface of the ground, provided the following specifications are complied with:

Such tanks shall be made of metal of sufficient gauge and tensile strength for the purpose for which they are to be used. All portions of such tanks are to be riveted together and shall be made liquid tight. Every such tank shall have a man-hole and shall be equipped with adequate ventilating or safety devices.

All tanks other than those located in buildings constructed under the provisions of Section 716 of this article, whether placed above or below the surface of the ground, shall have no building or structure of any kind whatsoever over or above the same; provided, however, that if any such tank be located near a railroad track or manufactory or place where sparks are likely to fall, and it is desired, in order to obviate such danger, to construct over such tank a shed or shelter, such

shed or shelter may be constructed upon a permit in writing therefor being issued by the Commissioner of Buildings; and such permit shall only be issued if it shall be shown that such shed or shelter is necessary and upon the express agreement that such shed or shelter shall be used for no other purpose than affording protection or shelter, and shall not be used for storage, manufacturing, residence, office, or any other purpose whatsoever.

Sec. 718. *Walls Around Tanks.*—Where any such storage tank or any portion thereof is erected or maintained upon or above the surface of the ground and is situated less than fifty feet from any other building or structure other than the buildings or structures upon the premises wherein such oils or fluids are to be used or stored, such tanks shall be separated from any such building or structure by an inclosing wall of brick, stone or concrete; and such wall shall be not less than five feet high and in no case of less height than two feet higher than the top of the tank which it is designed to separate from such building or structure. If such wall be ten feet high or less it shall be not less than twelve inches in thickness, and four inches in thickness shall be added for every additional ten feet or major fraction thereof of height added to such wall. Such wall shall entirely surround or inclose such tank; provided, however, that an opening may be constructed in such inclosing wall to permit access to the tank. Such opening shall contain a liquid-tight door made of incombustible material, either sliding or opening inward, and of sufficient strength to resist any pressure which may be brought to bear on such door by the bursting of the tank inclosed in such wall.

All such tanks and walls described in this section shall be constructed in accordance with plans and specifications which shall have been submitted to and approved by the Commissioner of Buildings.

Sec. 719. *Storage of Petroleum, Etc.*—It shall be unlawful for any person or corporation to keep or store crude petroleum, gasoline, naphtha, benzine, camphine, carbon oil, spirit gas, burning fluid, spirits of turpentine, or coal, rock or earth oil (excepting such refined oils as will stand a fire test of one hundred and fifty degrees Fahrenheit, according to the method and direction of John Tagliabue), upon or in any structure or premises, in any quantity exceeding one barrel of fifty gallons, within the city, except in such a building or such tanks as are hereinbefore described in this article, and where a quantity of any of such oils exceeding five gallons and not exceeding fifty gallons is kept in any premises other than such a building the receptacle or receptacles in which such oils is or are kept shall not be placed under any stairway or in any confined space, but shall be kept in such manner that no vapor or gas therefrom can collect in such a quantity as to become dangerous; and no such receptacle or receptacles shall be stored, kept or handled at any time within fifteen feet of any gas, candle, oil or other like artificial light or near any lighted stove, gas grate or any open flame of any kind whatsoever; provided, however, that a quantity of such oils exceeding one barrel of fifty gallons and not exceeding five barrels of fifty gallons each may be kept or stored in a room or apartment, the floor of which shall be at least five feet below the grade of the street adjacent to the building or structure in which such room or apartment is located, and such room or apartment shall have an air capacity of not less than fifteen hundred cubic feet and shall be properly ventilated in such manner as to prevent a dangerous accumulation of vapor or gas from such oils; and such room or apartment shall not be used for any purpose other than the storage and handling

of such oils. In any such room or apartment as is last above described turpentine may be kept in a quantity not exceeding five hundred gallons.

No gas, candle, oil, or other like artificial light or lighted stove, gas grate, or other open flame of any kind whatsoever shall be allowed within fifteen feet of any receptacle or receptacles containing any of the oils or fluids mentioned in this article, while located, kept, or stored in any such room or apartment. If more than fifteen (15) barrels of any of the oils hereinbefore described are kept in any such building as herein provided for, such building shall be located not less than 100 feet away from any other building or structure.

Sec. 270. *Petroleum, Etc., in Transit Not to Be Kept Near Buildings.*—It shall be unlawful for any person or corporation engaged in the business of transporting or delivering any of the oils or fluids mentioned in this article to permit such oils or fluids to remain in barrels, tanks, or other like receptacles, upon any railroad track, street, wharf, or dock for a longer time than is reasonably necessary to make provision for the storing or delivering of same; such time in no event, however, to exceed twenty-four hours.

Sec. 271. *Oils, Sale of, Regulated.*—It shall be unlawful for any person or corporation to sell, deliver, or receive any of the oils or fluids mentioned in this article, by gas, candle, oil, or other like artificial light.

ARTICLE XXV.

MISCELLANEOUS PROVISIONS.

Sec. 722. *Roofs for Spectatorial Purposes—Permits.*—It shall be unlawful for any person, whether owner, lessee, manager or person in control or having charge of any building within the city, to permit the use of the roof of any house or building, whether free of charge or through admission fee, to any person as a place of observation or for spectatorial purposes, unless he has first obtained from the Commissioner of Buildings of the city a permit; provided, however, it shall not be unlawful for any person, whether owner, lessee, or the person in control or having charge of such house or building, to permit the roof of any such house or building to be used as a place of observation or for spectatorial purposes for a number of persons not exceeding ten, and when no admission fee is charged.

Sec. 723. *Inspection as to Safety of Buildings.*—Before issuing the permit, as provided for in the foregoing section, the Commissioner of Buildings shall make an investigation as to whether such building is safe and secure enough to permit the presence of an estimated number of persons upon the roof thereof, and the permit so issued shall state the number of persons to be permitted on such roof. The Commissioner of Buildings shall see to it that every such roof is surrounded and enclosed with a railing or balustrade of sufficient height and strength to afford adequate protection.

Sec. 724. *Fee for Inspection.*—The person requiring such permit, as hereinabove provided for, shall make application to the Commissioner of Buildings for such an investigation, and shall pay, as a fee for such investigation and such permit, the sum of five dollars.

Sec. 725. *Penalty.*—Any person, whether owner, lessee, manager or person having charge or control of any such house or building within the city who shall permit, allow or tolerate the use of the roof of such house or building so controlled by him, by any person for a purpose within the mean-

ing of Section 722 of this article, without first obtaining a permit as hereinbefore provided for, and without having the safety of such roof tested and investigated by the Commissioner of Buildings, as hereinbefore provided for, or who shall permit a larger number of persons than is provided for in his permit to congregate upon such roof, shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense.

Sec. 726. *Windows, Cleaning of—Safety Devices.*—The owner or agent of every building hereafter erected in the city shall equip each and every window in any such building, above the second story thereof, with a suitable device or devices which will permit the cleaning of the exterior of each and every window in such building, above the second story, without danger to the person cleaning such windows, such devices shall be of such pattern and construction as will reasonably answer the purposes for which they are intended. Provided, however, that if windows are of such size that they may be easily cleaned from the inside, they need not be equipped with such devices.

Sec. 727. *Penalty.*—Any owner or agent of any building described in the preceding section who shall fail, neglect or refuse to comply with any of the provisions of such section, shall be fined not less than ten dollars nor more than fifty dollars for each offense, and each and every day which shall be allowed to elapse before any such building shall be supplied and equipped in accordance with the provisions of said section, shall constitute on the part of the owner or agent of any such building a separate and distinct offense.

Sec. 728. *Scaffolds—Protection During Building Operations—Temporary Floors.*—All scaffolds erected in this city for use in the erection, repair, alteration or removal of buildings, shall be well and safely supported, and of sufficient width, and properly secured, so as to insure the safety of persons working thereon or passing under, or by the same, and to prevent the falling thereof, or of any material that may be used, placed or deposited thereon.

It shall be the duty of every owner, person or corporation who shall have the supervision or control of the construction or remodeling of any building having more than three (3) framed floors, whether some or all of such floors are above or below the established street grade, to provide and lay upon the upper side of the joists or girders, or both, of the first floor below the riveters and structural steel setters, a plank floor, which shall be laid to form a good and substantial temporary floor for the protection of employes and all persons engaged above or below or on such temporary floor in such building.

Provided, however, that where the permanent floor is in place on the floor herein required to be planked, a temporary protective floor shall not be required.

If the floor or permanent floor of the second floor, or of any other floor above the second, or roof, is being placed previous to the permanent floor of the floor immediately below the floor which is being arched or planked, a good and substantial temporary floor shall be laid on the joists and girders of the next lower floor. For the purposes of this section the lowest framed floor in a building shall be considered the first floor.

In buildings more than three (3) stories high, where persons are working on a scaffold or scaffolds on the outside of such building, such persons shall be protected by well-secured planking, set over the heads of such persons for the full width of the scaffolding on which they are working, if another story or other stories are being raised above such

persons during the time they are working on such outside scaffold or scaffolding.

It shall be the duty of all owners, contractors, builders or persons having the control or supervision of all buildings in course of erection which shall be more than thirty (30) feet high, to see that all stairways, elevator openings, flues and all other openings in the floors shall be covered or properly protected.

Sec. 729. *Penalty.*—Any person violating any of the provisions of the foregoing section shall be fined not less than one hundred dollars nor more than two hundred dollars for each offense, and any permit granted for the construction of such building by the authorities of the city may be revoked in the discretion of the Commissioner of Buildings.

Sec. 730. *Gas or Electric Shut-off Device—Outside of Building.*—Every building within the city in which gas or electricity is used for illuminating, heating or other purposes shall be equipped with a device or devices which will enable firemen to shut off the supply of gas or current of electricity to any such building from the outside thereof; such device or devices to be placed at such a point or at such points on the outside of any such building as may be designated by the Fire Marshal of the city, and to be of such design and construction as to enable such device or devices to perform with reasonable certainty and safety the work required to be done thereby.

Any device or devices installed for the purpose of carrying out the provisions of this section shall first be approved by the Fire Marshal, and after the installation thereof the control of any such device or devices so installed in or upon any building under the provisions of this section shall be under the supervision of the Fire Department of the city.

Provided, however, that buildings used exclusively for residence purposes and outbuildings, sheds or barns attached or appurtenant to buildings used exclusively for residence purposes, shall be exempted from the provisions of this section.

Sec. 731. *Penalty.*—Any owner, agent or person having control or charge of any building coming within the provisions of the foregoing section, who shall neglect, fail or refuse to equip any such building with a device or devices such as are described in the foregoing section, shall be fined not less than fifty dollars nor more than two hundred dollars for each offense, and each day which shall elapse before the equipment of any such building with a device or devices as herein required shall be deemed a separate and distinct offense, and any person who shall disturb, meddle or tamper with any device or devices installed under the provisions of the preceding section, upon any building or buildings, without authority from the Fire Marshal, shall be fined not less than ten dollars nor more than one hundred dollars for each offense.

Sec. 732. *License—Contractors.*—Every person or corporation engaged within the city in the construction or repairing of the whole or any part of buildings and appurtenances shall be and he or it is hereby required to obtain a license from the city which shall permit him or it to engage thereafter in the business of contracting for the erection of buildings and appurtenances or parts thereof.

Sec. 733. *Application—Conditions.*—Amended by ordinance Nov. 25, 1907, to read as follows:

Every application for such license shall be made to the Commissioner of Buildings and shall set forth the name and residence or place of business of the applicant and the nature of the work which he or it desires to engage in for a period

of one year thereafter, and shall be accompanied by a fee of five dollars.

Sec. 734. *License to Be Issued*.—Said Commissioner shall thereupon issue a license in due form, permitting the applicant to engage in the business of contracting for the erection of buildings and appurtenances, or parts thereof, in the city for one year from the date of such license, which date shall be the first day of May in the year in which such license is applied for, and no license shall be granted for any period less than a year, and all licenses shall run from the first day of May in each year until the thirtieth day of April in the succeeding year.

Sec. 735. *Penalty*.—Any person or corporation who shall engage in the business of building in the city under contracts for the whole or any part of buildings and appurtenances, without first having obtained a license therefor as aforesaid, shall be fined not less than twenty-five nor more than one hundred dollars for each offense.

Sec. 376. *Walls—Structures—Buildings Altered to Conform to Chapter*.—No wall, structure, building or part thereof shall hereafter be built, constructed, altered or repaired within the city except in conformity with the provisions of this chapter. No building already erected or hereafter to be built within the city shall be raised, altered or built upon in such a manner that if such building were wholly rebuilt or constructed after the passage of this ordinance it would be in violation of any of the provisions of this chapter.

Sec. 737. *Buildings—Expense of Altering Recoverable from Owner by City*.—Whenever, in the opinion of the Commissioner of Buildings, it shall be necessary to tear down, alter, repair or rebuild any building or portion of any building which is dangerous, defective or unsafe, or which is reported to the said Commissioner by the Commissioner of Health to be unfit for human occupancy, or which has been built in violation of any of the provisions of this Chapter or of any ordinance regulating the construction of buildings hereafter passed, said Commissioner of Buildings shall cause such building or such portion thereof to be torn down, altered, repaired or rebuilt, or such work to be done thereon as he may deem necessary to render such building, or such portion thereof, safe or fit for human occupancy, and the expense thereof shall be recoverable from the owner or owners of such building by any proceeding that may be deemed appropriate.

Sec. 738. *Penalty—Fines for Violation of Chapter*.—Any person or corporation who violates, neglects or refuses to comply with, or who resists or opposes the enforcement of any of the provisions of this chapter, shall be fined not less than twenty-five nor more than two hundred dollars for each offense, and every such person or corporation shall be deemed guilty of a separate offense for every day on which such violation, neglect or refusal shall continue; and any builder or contractor who shall construct any building in violation of any of the provisions of this chapter, and any architect designing or having charge of such building who shall permit it to be constructed, shall be liable to the penalties provided and imposed by this section.

AMENDMENTS.

Passed March 1, 1909.

Be it ordained by the City Council of the City of Chicago:

Section 1. That it shall be unlawful for any person, firm or corporation to locate, build, construct or maintain on

any lot fronting on any street or alley in the city, in any block in which one-half of the buildings on both sides of the streets are used exclusively for residence purposes, any building or place used for a blacksmith shop, without the written consent of a majority of the property owners according to frontage, on both sides of such street or alley. Such written consent shall be obtained and filed with the Commissioner of Buildings before a permit is issued for the construction of such building or place; provided, that in determining whether one-half of the buildings on both sides of the street are used exclusively for residence purposes, any building fronting upon another street and located upon a corner lot shall not be considered.

Section 2. That portion of Section 692 of the Revised Municipal Code of Chicago of 1905, as subsequently amended relative to blacksmith shops, together with all other ordinances, or parts of ordinances, are hereby repealed in so far only as they are inconsistent with this ordinance.

Section 3. Any person, firm or corporation who shall violate any of the provisions of this ordinance shall be fined not less than five dollars nor more than one hundred dollars for each offense.

Passed December 21, 1908.

Be it ordained by the City Council of the City of Chicago:

Section 1. It shall not be lawful for any person, firm or corporation to locate, build, or construct on any street or alley in the city in any block in which two-thirds of the buildings on both sides of the street are used exclusively for residence purposes, any building for a theatrical, dramatic or operatic entertainment, show, amusement, game or public exhibition of any kind, intended or calculated to amuse, instruct or entertain where such show, amusement, game or exhibition is given for gain, or for admission to which the public is required to pay a fee, without the written consent of a majority of the property owners according to frontage on both sides of such street or alley.

Such written consent shall be obtained and filed with the Commissioner of Buildings before a permit is issued for the construction of any such building; provided that in determining whether two-thirds of the buildings on both sides of the street are used exclusively for residence purposes any building fronting upon another street and located upon a corner lot shall not be considered.

Passed January 25, 1909.

Be it ordained by the City Council of the City of Chicago:

Section 1. That it shall hereafter be unlawful for any person, firm or corporation to locate, build or construct any building for a theatrical, dramatic or operatic entertainment, show, amusement, field game or public exhibition of any kind intended or calculated to amuse, instruct or entertain where daily entertainments, shows, amusements, games or exhibitions are given for gain or for admission to which the public is required to pay a fee, within two hundred (200) feet of any church or building used exclusively for educational purposes; said distance to be measured by the shortest route between the entrance to the building sought to be located, built or constructed and the entrance to such church or building used exclusively for educational purposes.

ROLLER SKATING RINKS.

Ordinance passed May 18, 1908.

Be it ordained by the City Council of the City of Chicago:

Section 1. That no room or hall used for the purpose of a roller skating rink shall be constructed, operated or maintained above the first floor of any building.

Sec. 2. This ordinance shall be in full force and effect from and after its passage.

PROVISIONS FOR MOVING PICTURE MACHINES.

Sections 2, 3, 4, 6, 7, 8, 9, 10, 11, 12 and 13 are omitted as not containing anything of special interest to architects or builders, only those portions of the ordinance being published which might have bearing on construction.

Be it ordained by the City Council of Chicago:

Passed July 13, 1908.

Section 1. There is hereby established a Board of Examiners of moving picture operators, consisting of three members, who shall be appointed by the Mayor by and with the advice and consent of the City Council, and shall be subject to removal by the Mayor.

Sec. 5. All moving picture films, when not in use in the operating booth, shall at all times be kept in metal cases.

This ordinance was considered by the Committee on Buildings, recommended by it, and passed February 3, 1908.

ILLUMINATED ROOF SIGNS.

Be it ordained by the City Council of the City of Chicago:

Section 1. That Chapter LXI, Article II of the Revised Municipal Code of Chicago of 1905 be and the same is hereby amended by inserting in said Chapter LXI, Article II, between Sections 2181 and 2182, Revised Municipal Code of Chicago of 1905, as amended July 2, 1906, a new section to be known as Section 2181a.

HOSPITALS.

AN ORDINANCE RELATING TO HOSPITALS
WITHIN THE CITY.

Ordinances passed June 1, 1908.

Sections 1103, 1104, 1105, 1109a, 1109b, 1109c, 1109d, 1109e, 1109f are omitted as having no special bearing in construction of hospitals but containing requirements as to license and operation of interest to physicians and hospital management after the building is constructed.

Be it ordained by the City Council of the City of Chicago:

Section 1. That Section 650 of the Revised Municipal Code of Chicago of 1905, and Sections 279 and 691 of said Municipal Code as amended and now in force, be and the same are hereby repealed.

Sec. 2. That Article XIII of Chapter XXXII of the Revised Municipal Code of Chicago as amended February 26, 1906, be and the same is hereby amended to read as follows:

Sec. 1102. *Hospitals and Maternity Hospitals—Definitions.*—For the purpose of this article a hospital is hereby defined to mean any institution or place used for the reception or care, temporary or continuous of two or more sick, injured or dependent persons; or used for the treatment of two or more persons suffering from or afflicted with any mental or physical disease or bodily injury; including all hydropathic and massage institutions.

For the purposes of this article a maternity hospital is hereby defined to mean any institution, or place used for the reception and care, temporary or continuous, of one or more women during pregnancy while awaiting confinement, during confinement, or for one month or less after confinement while recovering therefrom.

Unless otherwise specified, the word "hospital" as used in this article includes maternity hospital.

Sec. 1105. *Hospital Building Board.*—For the purposes of this ordinance there is hereby created a Hospital Building Board which shall be composed of the Commissioner of Health, the Commissioner of Buildings and the Chief Fire

Marshal. The Hospital Building Board shall meet upon call of the Commissioner of Health and shall make such recommendations to the City Council as they may deem necessary or expedient for the construction and erection of new hospital buildings and for changes in buildings now being used or which may hereafter be used for hospital purposes.

Sec. 1107. *Accommodations for Patients.*—In every such hospital each room occupied or to be occupied by patients shall be of such dimensions as to give each patient not less than 800 cubic feet of space; every room shall have at least one window connecting with the external air for each two beds; said windows shall be of such dimensions as shall secure to each patient at least 2,400 cubic feet of fresh air per hour by natural ventilation, or in case said window shall not secure said 2,400 cubic feet of air per hour by natural ventilation, then each room shall additionally be fitted with such appliances for ventilation as shall secure to each patient in said room at least 2,400 cubic feet of fresh air per hour. Each bed shall have at least eighty square feet of floor space. In case of a maternity hospital, a regularly licensed physician must reside on the premises. Each ward or wing in said hospital shall have running water furnished in one or more places either in said ward or convenient thereto so that the same may be adequate and convenient to the occupants thereof; the plumbing, water closets, bath rooms and other sanitary appliances and conditions shall be constructed in accordance with the city ordinances relating to these matters. The building shall have the floor of the cellar properly cemented so as to be water tight; the halls of each floor shall be open to the external air with suitable windows and shall have no room or other obstruction at the end unless sufficient light or ventilation is otherwise provided for said hall and the building as a whole shall be provided with adequate and proper fire escapes, stairways or inclines or exits.

There shall be provided in each hospital building a suitable room or rooms approved by the Commissioner of Health to be used for the isolation of cases of contagious, infectious, epidemic or communicable diseases that may be found in the hospital until such time as the parties suffering from such contagious diseases shall be removed, in accordance with the rules and regulations of the Health Department; and a suitable room or rooms approved by the Commissioner of Health for the proper care of the dead pending their removal.

Sec. 1108. *Frontage Consents.*—It shall be unlawful for any person, firm or corporation to build, construct, maintain, conduct or manage in any block in which two-thirds (2-3) of the buildings fronting on both sides of the street or streets on which the proposed hospital may front are devoted to exclusive residence purpose, any hospital for the care, treatment or nursing of two or more insane persons; or any hospital for the care, treatment or nursing of two or more epileptics, or person suffering from the effects of the excessive use of alcoholic liquors; or any hospital for the care, treatment or nursing of two or more persons addicted to, or suffering from the excessive use of morphine, cocaine or other similar drugs or narcotics; or any hospital for the care, treatment or nursing of any person or persons affected with any contagious disease unless the owners of a majority of the frontage in such block, and the owners of a majority of the frontage on the opposite side or sides of the street or streets on which said building faces consent in writing to the building, constructing or maintaining, managing or conducting of any such hospital in said block. Such written consent of the majority of said property owners shall be filed

with the Commissioner of Health before a permit shall be granted for the building or constructing, or a license be issued for the maintaining, conducting or managing of any such hospital.

Sec. 1109. *Location of Hospitals Near School.*—No hospital of any kind or description, shall hereafter be erected or established within four hundred (400) feet of any property used for public or parochial school purposes.

STEAM BOILER AND STEAM PLANT INSPECTION DEPARTMENT.

According to the Municipal Code, with code number and amendments to date.

Section 2204. *Department Established—Chief Inspector.*—There is hereby established a department for the inspection of steam boilers and steam plants, the head of which shall be known as the Chief Inspector of Steam Boilers and Steam Plants.

Sec. 2205. *Appointment.*—He shall be appointed by the Mayor by and with the advice and consent of the City Council.

Sec. 2206. *Qualification.*—The person so appointed shall be well qualified from practical experience in the design or construction and operation of boilers, generators, and superheaters, and their appurtenances, used for generating steam for power, steaming or heating purposes, to enable him to judge of their safety for use as such. No person employed in the department created by this chapter shall be directly or indirectly interested in the manufacture, ownership, or agency of steam boilers or other apparatus or appliances used in the generation or use of steam, which are to be inspected.

Sec. 2207. *Bond.*—The Chief Inspector of Steam Boilers and Steam Plants, before entering upon the duties of his office, shall execute a bond to the City of Chicago in the sum of five thousand dollars (\$5,000) with sureties to be approved by the Mayor, conditioned for the faithful performance of the duties of his office.

Sec. 2208. *Supervising Mechanical Engineer.*—There is hereby created the office of Supervising Mechanical Engineer and Chief Deputy Inspector of Steam Boilers and Steam Plants. He shall be appointed by the Chief Inspector of Steam Boilers and Steam Plants according to law.

Sec. 2209. *Bond.*—The Supervising Mechanical Engineer and Chief Deputy Inspector of Steam Boilers and Steam Plants, before entering upon the duties of his office, shall execute a bond to the City of Chicago in the sum of five thousand dollars (\$5,000), with sureties to be approved by the Comptroller conditioned for the faithful performance of the duties of his office.

Sec. 2210. Repealed July 8, 1907. See Smoke Ordinance.

Sec. 2211. (Amended July 8, 1907)—*Board of Inspectors of Steam Boilers and Steam Plants—To Inspect City and Board of Education Boilers.*—The department of steam boilers and steam plants shall have the same power over all steam boilers and steam plants owned or operated by the city or Board of Education as over all other steam boilers and steam plants in said city; and all steam boilers or steam plants owned, operated or controlled by the city or the board of education of said city shall be subject to the requirements of this chapter; and it shall be the duty of said department to inspect at least once in each year all of such steam boilers and steam

plants as are owned, operated or controlled by the city or said Board of Education, and also to preserve a record of the condition of such steam boilers or steam plants as shown by such inspection. No fee shall be charged or paid to said department nor to any employee under said department for the inspection of any steam boiler or steam plant or for the certificate of inspection issued by said department for any steam boiler or steam plant owned, operated or controlled by said city.

Sec. 2212. (Amended July 8, 1907)—*Duties of the Board.*—It shall be the duty of the department to inspect all boilers, tanks, jacket kettles, generators or other apparatus used for generating or transmitting steam for power, or using steam under pressure for heating or steaming purposes, and all other tanks, jacket kettles, and reservoirs under pressure of whatsoever kind, except as hereinafter provided, as often as once in each and every year, by making a hydrostatic pressure test where such tests shall be deemed necessary; provided, that the hydrostatic pressure used in such test shall not exceed the maximum working pressure of said apparatus by more than fifty per cent; and by making a careful external and internal examination. In all cases where hydrostatic pressure test is used an internal examination of said apparatus shall afterwards be made. In certifying the working pressure allowed on each steam generator or other apparatus the same shall be determined by multiplying one-fifth of the lowest tensile strength of any plate in the cylindrical shell of said steam boiler or steam generator or other apparatus by the lowest efficiency of joint in such cylindrical shell expressed in decimals, and by multiplying the product by the thickness, expressed in inches or parts of an inch, of the thinnest plate in the same cylindrical shell and divide by the radius, also expressed in inches. This sum will be the pressure allowable per square inch of surface.

Any boiler, tank, jacket kettle, generator or reservoir having been in use eight years or more and its condition being such that in the opinion of the inspector the same should be drilled in order that the exact thickness and condition may be ascertained, he shall report the same to the Chief Inspector of Steam Boilers, who shall serve the owner or agent with a written notice to show cause to the Chief Inspector within five days why such boiler, tank, jacket kettle, generator or reservoir should not be drilled.

If, after the owner or agent has been heard, or at the end of five days, the Chief Inspector deems it necessary that the boiler, tank, jacket kettle, generator or reservoir be drilled, then the boiler, tank, jacket kettle, generator or reservoir may be drilled at points near the water line, and at the bottom of shell of boiler, or such other points in the boiler, tank, jacket kettle, generator or reservoir as the inspecting officer may direct, and the thickness of said material shall be determined thereafter at such annual inspection as the inspecting officer may deem necessary, and the steam pressure or other pressure allowed shall be governed by such ascertained thickness and general condition of boiler, tank, jacket kettle, generator or reservoir. And the drilling and plugging of said holes shall be done at the expense of the owner.

Any boiler may be tested and rated in accordance with the United States Marine Inspection Law governing the inspection of steam boilers. But no boiler, tank, jacket kettle or jacket constructed or reconstructed of boiler plates hereafter, where the same are required shall have stay bolts of less than seven-eighths of an inch in diameter and pitched more than seven inches apart. All stationary boilers, tanks, jacket kettles or packets carrying a pressure of one hundred pounds

or over to the square inch, the construction of which requires stay bolts, shall be equipped with hollow stay bolts. All boiler heads made of boiler plate shall be braced with braces, the sectional area of which shall not be less than one square inch each, so pitched that a greater strain than six thousand pounds per square inch of section shall not be carried by any one brace or stay bolt. In computing the strain on braces in flat surfaces the diameter of brace rivets shall be considered. In computing the strain on shells having dished heads the pressure will be figured according to the radius of the heads.

It shall be the duty of the department to see that the boiler or boilers, boiler setting, means of producing draft, smoke connections and furnace or fire box of each boiler inspected by it are of sufficient capacity or so constructed as with proper management to avoid the issuance of emission of dense smoke from any chimney or smokestack connected therewith.

Sec. 2213. Repealed July 8, 1907. See Smoke Ordinance.

Sec. 2214. Repealed by City Council January 22, 1906.

Sec. 2215. (As amended January 2, 1905)—*Prosecutions for Violations—By Whom to Be Instituted.*—Provides that prosecutions for all violations of above section shall be instituted by the Chief Inspector of Steam Boilers and Steam Plants or his deputy in the name of the City of Chicago.

Sec. 2216. (Amended July 8, 1907)—*Permit for New Plants* *Plants, Etc.*—No new plant, nor any reconstruction of any old plants, for producing power and heat, or either of them shall be erected or maintained in the city until the plans and specifications of the same have been filed in the office of and approved and a permit for such erection or construction issued by the Chief Inspector of Steam Boilers and Steam Plants, which plans and specifications shall show the amount of work and the amount of heating to be done by such plant and all the appurtenances thereto, including provisions for the complete combustion of the fuel to be used and a statement of the kind of fuel proposed to be used. Such plans and specifications shall also show that the room or apartment in which such plant shall be located is provided with doors, windows, air-shafts, fans, and other means of ventilation sufficient to prevent the temperature of such room, apartment, basement or other portion of such building wherein such steam plant or apparatus is to be used, from rising to a point higher than one hundred and twenty degrees Fahrenheit, or that the atmosphere of any such apartment wherein such apparatus may be located may be entirely renewed every ten minutes. Upon approval of such plans and specifications, a duplicate set of which shall be left on file in said office, and the payment of fees as hereinafter provided, and upon the presentation to the department of a permit issued by the department of smoke inspection, said Chief Inspector shall issue a permit for the installation of such plant or such reconstruction. Such permit shall state the maximum amount of steam pressure to be carried. As soon as the department hereby created has examined the plans and specifications submitted for a new steam plant in a new building and has issued a permit for the installation of same it shall notify the Commissioner of Buildings to see that the execution of the construction work on the building in which such plant is to be installed is carried out in conformity with the plans and specifications of the proposed steam plant for the execution of which a permit has been issued, with special reference to the amount of space to be used for such appurtenances, the size and construction of the chimney or chimneys to be used, and the provisions for ventilation and proper temperature in the engine and boiler room.

It shall be the duty of the Supervising Mechanical Engineer and Chief Deputy Inspector of Steam Boilers and Steam Plants to examine in detail all plans and specifications that may be submitted to the department, and to report upon the same for approval by the department.

Sec. 2217. (Amended July 8, 1907)—*Duty of Officers.*—It shall be unlawful for any person to use any steam boiler or any tank or tanks subject to pressure other than city pressure, until he shall have first procured a certificate from said Chief Inspector that such apparatus may be safely used, and that the boiler or boilers, boiler setting, means of producing draft, smoke connections and furnace or fire box are of such size and capacity that they will do the work required, and be capable of being so managed for the purpose of generating steam that no dense smoke shall be emitted from the chimney connected with such furnace or fire box.

If such owner, agent or person using a steam boiler or tank shall fail to notify said Chief Inspector of his intention to make any alteration, repairs or enlargement of such steam plant, and shall fail to file plans and specifications for the enlargement or alterations of the same, and shall proceed to make such alteration, repairs or enlargement without a permit therefor, he shall be liable to a fine of twenty-five dollars for each day on which he shall have prosecuted such alteration, repairs or enlargement without said permit, and each day's violation shall constitute a separate offense. Provided, however, that minor necessary or emergency repairs which do not increase the capacity of such apparatus or involve any substantial alteration of structure may be made by or under the engineer in charge of such apparatus without permit or report thereof.

If at any time when inspecting a steam boiler, generator or other apparatus used for generating steam for power or heating purposes the inspector of boilers shall find that the furnace or fire box in which fuel is used for the purpose of generating steam is so constructed or operated as to cause the emission of dense smoke from the chimney connected therewith he shall report to the department of smoke inspection the condition of such plant.

Provided, that any boilers for heating purposes only, in which the permit specifies that not more than ten pounds of steam pressure to the square inch shall be carried, shall be known as "low pressure boilers."

After the next inspection of such low pressure boilers shall have been made following the adoption of this ordinance, inspections thereafter shall be made once in every three years. But all of such low pressure plants may be inspected at any time thereafter and without charge, with reference to the provisions for draft, complete combustion or degree of combustion of fuel and prevention of the emission of smoke.

Sec. 2218. *Exceptions.*—The provisions of this chapter relating to the inspection of boilers, generators or other apparatus carrying other than city pressure shall not apply to such boilers, generators or apparatus while in use or installed in any locomotive, steam or tug boat. The provisions of this chapter relating to the inspection of steam boilers, generators or other apparatus carrying other than city pressure shall be held to apply to any such steam boiler, generator or apparatus in use or installed in any steam roller, steam derrick, steam pile driver, automobile or other movable structure or contrivance of any kind whatsoever used within the city. Provided, however, that this ordinance shall not apply to boilers, generators or other apparatus used in private residences for generating steam solely for heating purposes; and for the purpose of this ordi-

nance flat buildings or apartment buildings with more than three apartments shall not be classed as private residences, and any steam boiler, generator or other apparatus used for generating steam in flat buildings or apartment buildings having more than three flats or apartments shall be subject to inspection as hereinbefore provided.

Sec. 2219. *Certificate—Record.*—When an inspection of a boiler or boilers, tank or tanks, jacket-kettle, generator or generators, superheater or superheaters, or any apparatus under pressure, has been made, and the same shall be approved by the Chief Inspector or Supervising Mechanical Engineer and Chief Deputy Inspector of Steam Boilers and Steam Plants, he shall make and deliver to the person for whom the inspection was made, upon the payment of the fees hereinafter mentioned, a certificate of such inspection, which shall contain the date of inspection, together with a general description, for what purpose used, the number of try-cocks, steam and water gauges, the pounds pressure at which they may be safely used; which certificate shall be framed and put up in a conspicuous place in the engine or boiler room, and a record of the same shall be made and kept by said Board, in a well-bound book or books, indexed alphabetically or by locality.

Sec. 2220. See Smoke Ordinance.

Sec. 2221. *Inspection of Repairs.*—It shall be the duty of said Inspector, upon an application in writing made by any person, firm, corporation, or agent, owning, leasing or controlling the use of any boiler, tank, jacket-kettle, generator, or superheater, stating that the same is out of repair or has been repaired, to examine the same when so repaired, and determine if such repairing has been properly done; and it shall be unlawful for any person, firm, corporation, or agent to use any boiler, tank, jacket-kettle, generator, or superheater, after the same has been repaired, until a certificate shall have been procured from the Inspector to the effect that such repairing has been properly done, and such boiler, tank, jacket-kettle, generator, or superheater may be safely used, except as hereinbefore provided in this chapter.

Sec. 2222. *Fees.*—The fees for inspection of steam boilers and other apparatus under this chapter shall be as follows:

Class A. Including steam boilers, tanks, jacket-kettles, of a capacity of seventy-five gallons or over, generators, or other apparatus under a pressure exceeding ten pounds per square inch in plants where only one such apparatus is used, five dollars each.

Class B. Steam boilers, generators, or superheaters under pressure exceeding ten pounds per square inch in plants where more than one such is used, five dollars for the first and three dollars for each additional apparatus.

Class C. Tanks and jacket-kettles, of a capacity of seventy-five gallons or over, under pressure in plants where more than one such tank or jacket-kettle is used, one dollar each for all after the first.

Class D. All low-pressure steam boilers as herein described in this chapter, three dollars each.

Class E. The fee for a permit for a new steam plant or for additions to an old plant shall be five dollars for each boiler or tank to be used under pressure or for the addition or rebuilding of any smokestack or chimney or for any material alteration or change made in such plant. The fee for the inspection of steam boilers and other apparatus above provided for shall be double the respective amounts above specified when an inspection is made on Sunday or any legal holiday at the request of the person or corporation owning or operating said steam boilers or other apparatus.

All fees provided for in this chapter shall be paid to the City Collector.

Sec. 2223. (Amended July 8, 1907.)—*Exemptions—Charitable, Religious and Educational Institutions.*—Said Chief Inspector may, and he is hereby directed and instructed to remit all inspection fees charged, or that may hereafter be charged, against any and all charitable, religious, and educational institutions, when the boiler or other apparatus inspected is located in or upon premises used or occupied exclusively by such charitable, religious or educational institution; provided, that such charitable, religious or educational institution is not conducted or carried on for private gain or profit, and provided further, that said Chief Inspector may require every application for the remission of such fees to be verified by the affidavit of one or more taxpayers of the city.

Sec. 2224. *Charging Excess Fees.*—If any person acting on behalf of the city under the provisions of this chapter shall take or receive any money or any valuable thing for the purpose of deceiving or defrauding any person or persons, or for the purpose of favoring any person or persons, or if any inspector shall recommend the issue of any certificate of inspection without having at the time stated thoroughly examined and tested the boiler so certified, he shall be fined one hundred dollars (\$100) for each offense.

Sec. 2225. (Amended July 8, 1907.) *Try-Cocks, Gauges, Force Pumps.*—It shall be the duty of every person or corporation owning, leasing or controlling the use of any steam boiler or boilers, subject to inspection, as hereinbefore provided, to provide and properly affix to each and every one of such boilers a full complement of try-cocks, one water gauge, one fusible plug of good Banca tin, one or more pop safety valves (the area of pop valves shall be in the ratio of one square inch to three square feet of grate surface): Provided, that on boilers used for generating steam for heating purposes only and carrying not more than ten pounds steam pressure, direct weighted safety valves may be used. On each steam boiler or steam generator, or other apparatus subject to inspection, there shall be placed a suitable shut-off or main stop valve so placed as to prevent the water passing into the heating apparatus during the test made at the time of inspection; provided, that shut-off or main stop valves shall be required only in plants to be hereafter installed, and a good and sufficient force pump or other means of supplying the boiler with water; also a good and sufficient safety valve or reducing valve to all tanks or jacket-kettles, properly attached. No stop or shut-off valve shall be placed between a boiler, tank or jacket-kettle and the safety valve.

After inspection the inspector shall seal all safety valves, and said seal shall not be broken, except by authority of said department, except in case of emergency, and when the seal is broken a complete report of the same shall be made to said department within twenty-four hours; and said valve shall be resealed forthwith by said department without charge, provided the circumstances of the breaking of said seal are approved by said department.

Sec. 2226. *Owners to Provide Facilities.*—Every person owning or having possession or control of any steam boilers, tanks, jacket-kettles, generators, or superheaters, subject to inspection as aforesaid, shall provide at his own expense proper arrangements and facilities for attaching the instruments of inspection. Immediately before the time set for such inspection, every person shall remove all scale, dirt, soot, and sediment in, beneath, and around such boiler, shall fill the same with water, when so directed by the Inspector, and have

all main stop valves and other valves and connections on said boiler or boilers perfectly tight, so that the Inspector may be able to apply hydrostatic pressure, leaving all said apparatus in clean condition for inspection.

Sec. 2227. *Engineer's Negligence, Maximum Pressure, and Safety Valves.*—Any engineer or other person in charge of a steam boiler or generator who shall negligently or wrongfully endanger the life of any person by permitting the water to fall below three inches above the flues or crown sheet of any boiler, or shall disturb the spring or weight on the safety valve, or break the seal of the safety valve, or tamper with it so as to carry more pressure than allowed by the Inspector, or who shall otherwise neglect his duties, shall be subject to a fine of not less than \$25 nor more than \$100 for each offense and it shall be the duty of the Chief Inspector to report the facts to the Board of Examining Engineers.

The safety valves of steam boilers shall not be loaded to sustain more than the maximum pressure allowed by said Inspector, and the area of the discharge of each safety valve shall be equal to the full area of the valve, and all safety valves shall be directly open to the atmosphere.

Sec. 2228. (Amended July 8, 1907)—*Manufacturers and Dealers—Notify Inspectors.*—Any person or corporation manufacturing, dealing in, selling or erecting steam boilers, tanks, jacket kettles, or generators, subject to inspection under this chapter, shall, on the sale or delivery of such steam boiler, tank, jacket kettle, or generator at any point or locality within the city, notify the said Chief Inspector, giving the name of the owner, name of maker, number and name of street, or otherwise designate the locality of said delivery or sale; shall state also the thickness and quality of the material used in the construction and the brand stamped on the plate.

Sec. 2229. *Second-Hand Dealers.*—All steam boiler manufacturers, second-hand steam boiler and junk dealers, and any other person selling second-hand steam boilers, tanks, jacket-kettles, generators, or superheaters, shall before painting the same have them inspected by the Department of Steam Boiler and Steam Plants, and have in their possession a certificate issued by said Department, showing the amount of pressure per square inch the said steam boiler, tank, jacket-kettle, generator or superheater is allowed to carry before offering for sale any second-hand steam boiler, tank, or jacket-kettle, generator, or superheater, and give the buyer the said certificate of inspection. Any person or corporation violating this section shall be fined not less than ten dollars

(\$10), nor more than one hundred dollars (\$100), for each offense.

Provided that any person or persons disposing of a second-hand steam boiler, tank, jacket-kettle, generator, or superheater, which has been in use, shall not be required to secure inspection if said steam boiler, tank, jacket-kettle generator, or superheater is sold to a dealer in or repairer of such apparatus, but such inspection shall be had before such articles are sold for use.

Sec. 2230. *Penalty.*—Any person who shall violate any of the provisions of this chapter shall be fined not less than twenty-five dollars (\$25), nor more than one hundred dollars (\$100), for each offense.

Sec. 2231. (Amended July 8, 1907)—*Apparatus—Record.*—The city shall provide such instruments, books, papers and equipment as shall be necessary for the proper performance of the duties of such department, which shall be the property of said city, and which shall be delivered by said Chief Inspector to his successor in office. Said Chief Inspector shall report annually on or before the first day of February to the Mayor and City Council, and as often as required by said Council.

Said department shall prepare and keep in its office a record of each steam boiler, steam generator, tank, jacket-kettle, or other apparatus used for the generation of steam or under pressure other than city pressure, and at the first inspection of any such apparatus under and by virtue of this chapter a number shall be securely stamped upon the same with a steel stamp or die, of not less than one-half inch in height, in a conspicuous and easily accessible place upon said apparatus, which number shall be the office number of such piece of apparatus, and the designation by which the same shall be known in said record after such inspection; and said record shall contain a full description of such piece of apparatus, together with the use for which it is employed, the place where it may be located, the name of the owner, agent, or lessee of said apparatus, together with the amount of pressure allowed by the Inspector for the same, and the kind of fuel used, together with the number of try-cocks, steam and water gauges, and any special information pertaining thereto, including a record of inspections made.

Sec. 2232. (Amended July 8, 1907)—*Report Defects in Furnaces and Smokestacks.*—It shall be the duty of the assistant inspectors to report to said Chief Inspector defects in furnaces and smokestacks as well as in boilers.

CHICAGO TELEPHONE COMPANY

Twenty-one specially constructed buildings



SOUTH CHICAGO



WEST PULLMAN



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DOUGLAS



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SD. DIV. BARN



OAKLAND

In addition to the above, all of which have been built within twenty-five years, the Company occupies over two hundred and sixty-five thousand square feet in other buildings (owned and leased) within the Chicago City limits. Over 210,000 telephones are now in operation within the Chicago City limits, connecting with 55,000 in adjoining counties and over 4,000,000 throughout the country.

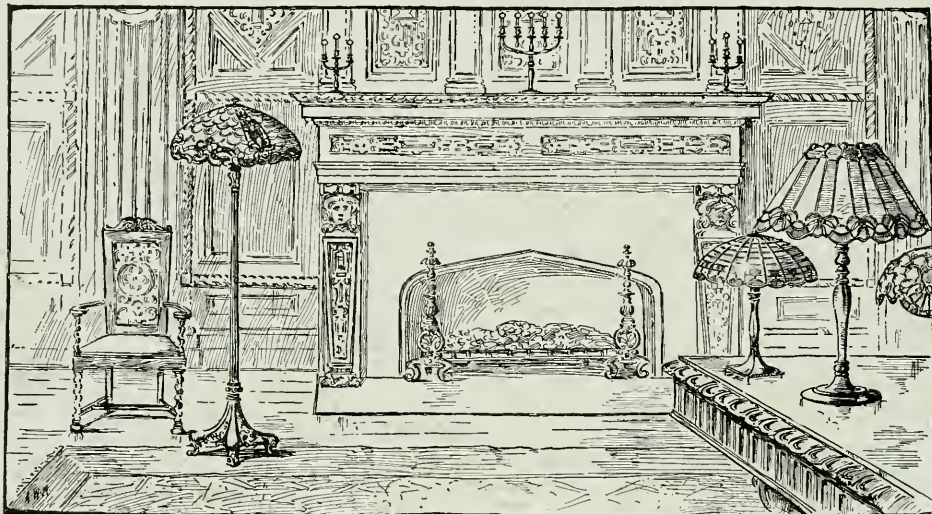
CHICAGO TELEPHONE COMPANY, 191-203 Washington Street, Chicago.



ELECTRIC SHOP

JACKSON and MICHIGAN BOULEVARDS
CHICAGO

ARCHITECTS, AND THOSE CONTEMPLATING BUILDING or improving upon the electrical arrangements of the home, will find a wealth of suggestion at ELECTRIC SHOP, located on the ground floor, northwest corner of Jackson and Michigan Boulevards—a permanent exhibition of educational value, no less than of artistic attractiveness. *Something electrical* to interest everyone.



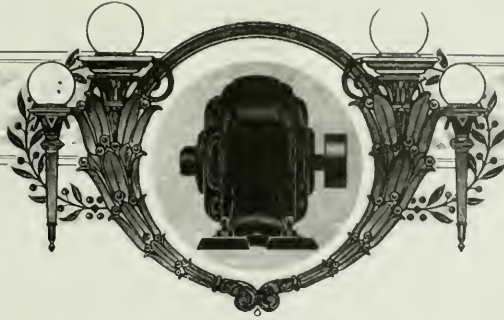
VIEW IN RECEPTION ROOM, ELECTRIC SHOP, SHOWING ELECTRIC GRATE

Being centrally located with respect to the shopping district, ELECTRIC SHOP affords visitors many conveniences aside from its interesting displays of lamps, fixtures and electrical devices of all kinds, which they are invited to inspect and enjoy. A convenient location for the payment of electric light bills.

The architectural features of ELECTRIC SHOP will prove of especial interest to the Architect and Builder. The interior design, being Elizabethan in style, antique gray finished oak in richly carved panels, is far in advance of anything yet seen in the west. The furniture is also of carved oak, especially designed in the Elizabethan style. The beams of the ceiling are richly decorated in gold and the strong primary colors. The ceiling between beams is treated in deep old gold. The dining room is designed in the style of the early English Renaissance. The effect withal is most pleasing. Your inspection is invited.



COMMONWEALTH EDISON COMPANY



Electric Light and Power

from the Central Station

The Modern Method



WHETHER YOU REQUIRE A SINGLE HORSE-POWER or 50,000 or more, you can buy it to your decided advantage from Central Station. Electric Power is clean, reliable, economical.

Our service is available day and night—no heavy expense for overtime, no investment in generating plant, no depreciation charges.

Call Randolph 1280

Commonwealth Edison Company

General Offices, 139 Adams Street, Chicago

THE LOWERING OF A TUNNEL UNDER THE CHICAGO RIVER

THE old Van Buren Street tunnel under the Chicago River at Van Buren Street, $2\frac{1}{4}$ miles from the mouth of the river in Lake Michigan, was a double track tunnel used by the Chicago Union Traction Company for transporting passengers in street cars between the west and the east sides of the Chicago River; the lowering of the river level, due to the opening of the Drainage Canal, left only 15 to 16 feet of water over the tunnel, and Congress ordered its removal so 22 feet of water would be provided over it the full width of the river.

It was decided by the Union Traction Company, owners of the tunnel, to lower it and exhaustive plans and specifications were prepared by Mr. Samuel G. Artinstall. The contract was awarded to the Great Lakes Dredge & Dock Company.

The work of lowering the Tunnel consisted essentially in putting in a new roof inside or under the old one, and also putting in a new bottom or invert; the side walls were left practically intact. The work progressed rapidly and the job was finished in 19 months. The new roof, which is 9 feet 6 inches below the top of the old roof, consists of transverse I-shape steel girders, 32 feet long over all, spaced 4 feet 3 inches apart on centers. The girders are carried at the ends by columns which are 15-inch 80-pound I-beams seated on brick masonry piers built up to the springing line of the arch. These piers are placed in chases cut two feet deep into the old brick side walls of the tunnel, as shown in the accompanying photograph. The spaces between the roof girders are filled with concrete and a jack arch formed between each pair of girders. The concrete for the jack arches was mixed by hand in the limited space between the new roof girders and the old floor and hoisted up through a space obtained by omitting one jack arch. Over this layer of concrete are two courses of brick placed in an asphalt compound while it was still hot, which serves as the water-proofing of the roof. As a covering for this is a layer of concrete twelve inches thick, reinforced by a system of wires.

The placing of the large roof girders was greatly handicapped on account of the limited head room in the tunnel. They weighed five tons each and were made up ready for erection when delivered. They were conveyed

into the tunnel to the place of erection on flat cars run on the street car tracks, from which they were jacked up and placed in proper position. The accompanying photograph shows the roof girders in place before the concreting.

The invert of the tunnel was lowered eight feet in the section under the river and the walls of the tunnel were underpinned to that depth; the underpinning gradually decreasing towards each portal where it retains the same grade as before. The invert lowering had to be done in narrow sections or "ribs" and in different parts of the tunnel so as to give the finished portions plenty of time to set and still keep the new roof and side walls well braced and at the approaches to avoid possible

damage through settlement to the heavy buildings adjoining. These sections were pits ranging from five to eight feet in width, dug transversely across the tunnel to a depth of from ten to eleven feet below the old floor level at the center line of the tunnel. They penetrated the side walls of the section about four feet and up to the masonry piers on which the columns holding the roof girders were mounted. In digging these pits through the side walls in the river sections the inner rows of piles

of the old cofferdam were occasionally encountered, showing the tremendous side pressure of the clay which squeezed these piles inside the lines of the work.

The pits were concreted so that the new invert is eight feet below the old invert and the concrete placed in the pits in the side walls connects with the concrete placed when the columns were put in; thus connecting the arch and the invert.

Over the approach ends of the new roof of the tunnel up to the old arch, solid bulkheads suitably waterproofed, were built; so when the arch of the old tunnel was removed in the river section the water could not run in over the new roof. The west bulkhead is 26 feet thick and the east one ten feet.

The Great Lakes Dredge & Dock Company also had the contract to remove the masonry of the old tunnel arch down to the line of the new roof. It was required that the masonry be destroyed as much as possible from the under side after the new work had been made tight and without the aid of cofferdams or explosives and to avoid hindrance to navigation, and as much as possible



any concussions or jars that might injure the new construction or the adjoining tall heavy buildings.

The destroying and removing of the old roof was carried out in a novel way. A cushion of sand was placed over the new roof underneath the old arch to protect it from the debris that would naturally fall on it in the wrecking. One of the Great Lakes Dredge & Dock Company's drill boats in the river above started the work by drilling cuts across the arch about 4 feet apart on one side of the river. This strip of old masonry

was then taken out and another strip executed in a similar manner; thus successive strips were broken off across the channel. The loosened material which lay on top of the new roof was then removed by one of the Company's dredges carefully operated so as not to damage the new roof.

The lowering of the Van Buren Street tunnel by the Great Lakes Dredge & Dock Company was the first operation of this kind ever successfully executed.

CONSTRUCTION OF THE HARBOR AT GARY, INDIANA

THE great number of the largest boats on the Great Lakes that would run between the mine railroads on Lake Superior and the new steel plant at Gary, Indiana, necessitated the provision of proper and sufficient harbor and docking facilities for the latter. The construction of a harbor for the new steel plant was considered one of the most difficult and extensive engineering works required in building that plant, mostly on account of the unfavorable natural conditions there. The shore line in that vicinity is a low, flat, and practically unbroken sandy beach. The sand is a fine lake sand variety and it exists to a depth of from forty feet to sixty feet from the surface. This sand was shifting and lay in alternate ridges and hollows parallel to the shore line. These ridges rose from fifteen to forty feet above the water in the lake with the hollows in between about ten feet above that level. The water here was very shallow as the minimum depth of twenty-two feet in channel construction on the Great Lakes was not reached until about 2,000 feet off shore in the lake.

The contract for the construction of the harbor and a slip was awarded the Great Lakes Dredge & Dock Company. The slip, which is 250 feet wide and about a mile in length, with a minimum depth of twenty-two feet, is built at right angles to the shore line and extends 2,000 feet out from shore line to the twenty-two foot depth in the lake and 3,000 feet inland—total amount of excavation estimated at 1,900,000 cubic yards. It was dug by the Great Lakes Dredge & Dock Company's hydraulic dredges "Michigan" and "New York," the latter having a twenty-four inch diameter suction pipe and a capacity of 10,000 cubic yards per twenty-four hour day.

Both sides of the slip were closely lined along with

sheet piling, which on the west side was later topped with a concrete dock. The off shore pier along the west side of the slip extends 2,000 feet out from the end of the concrete dock and is a rock filled timber and pile pier varying from twelve feet wide at the shore to twenty-four feet wide at its farthest end in the lake.

At the outer end of this pier a rock filled timber and pile pier 2,000 feet in length and 24 feet in width extends to the west in the lake at a right angle to the slip. The space enclosed by this pier was formerly covered with about twenty-two feet of water and has been filled in with sand by the hydraulic dredge "New York" to a height of from three feet to eighteen feet above

datum. On this made land, aggregating about 4,000,000 square feet, the blast furnaces, etc., of the new steel town are now being built. The off shore pier on the east side is similar to that on the west side of the slip beyond the concrete dock.

In the construction of the timber and pile piers, 25,000 piles and 7,000,000 feet B. M. of timber was used. The work was handled by six floating pile drivers, each equipped with a pump operating a hydraulic jet. All the piling and sheeting was driven with the assistance of a water jet, as the sand was of such a nature that a pile would break before it would penetrate the sand under the blows of the hammer unless the jet was used.

The construction of the slip and piers is almost completed, but work is still in progress on the excavation of 250,000 yards for the turning basin at the end of the slip and also on the 3,200 lineal feet of outer breakwater which is now being built in depths of water varying from 20 to 40 feet. The Great Lakes Dredge & Dock Company is also contractor for the two latter works.



CHICAGO'S GARDEN SPOT
IS THE
Beautiful North Side
REACHED BY THE
**Northwestern
Elevated Railroad**

The Excellent Transportation Facilities of This Line
Insure to the Chicago Public

Speed, Safety, Comfort and Convenience

<u>EQUIPMENT</u>	Its Car Equipment has been increased thirty-three per cent within the past eighteen months, although
<u>TRAFFIC</u>	Its Passenger Traffic has increased but twenty per cent within the same period of time.
<u>POWER</u>	Its Electric Motive Power has been increased more than 5,200 horsepower within the past twelve months.

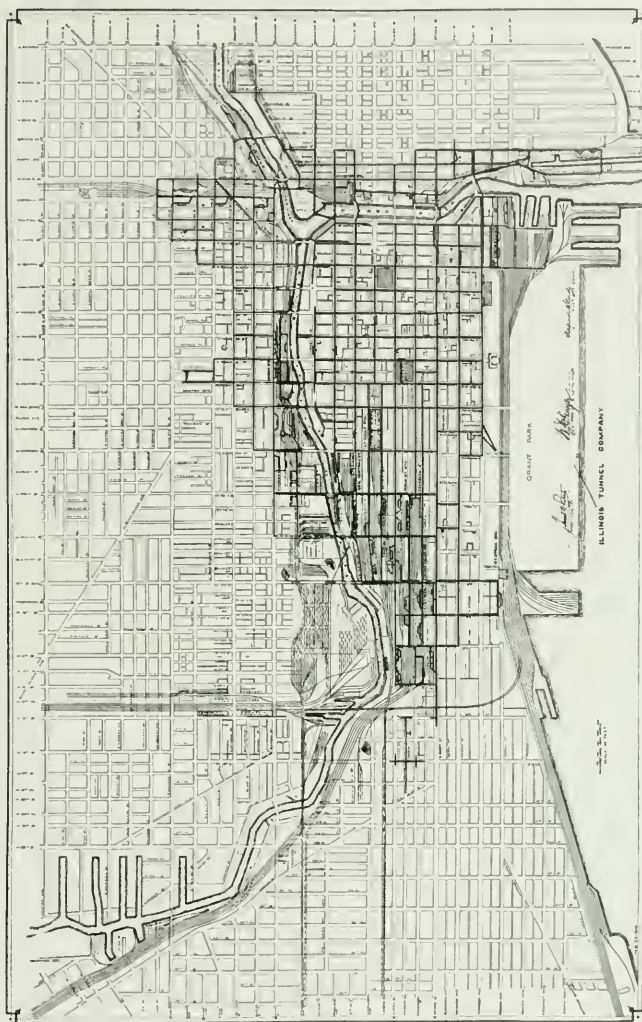
**Nine Reasons Why the Northwestern Elevated Railroad Should
Enjoy Popularity and Win Patronage:**

1. Its cars are large, well ventilated, convenient and comfortable.
2. Its new Pullman cars, now installed, provide seats for 28 people facing forward instead of 8 as in most elevated railroad cars.
3. Its curves are being modified at great expense, thereby adding to the convenience of the public and insuring speedier service.
4. Its extensions of lines, made at an expense of \$3,500,000, enable the public to reach every North Side section conveniently.
5. Its North Water Street Terminal accommodates 2,500 passengers daily and does much to relieve congestion of traffic on the Loop.
6. Its six-car trains from the North Water Street Terminal are the only Chicago elevated railroad trains composed of six cars.
7. Its Express train service is first-class in every respect and with the co-operation of the public will be improved.
8. Its lines reach every point of interest and recreation between the Loop and Evanston, connecting with the Chicago & Milwaukee Electric Railway cars for all points north.
9. Its local cars on all trains are almost always only partly filled during rush hours, so that ample accommodations may be found.

PASSENGERS ARE EARNESTLY REQUESTED to co-operate with the management in further improvement of the service by taking such trains as will carry them to their destination **WITHOUT CHANGE OF CARS**

**From Every Point of View This is the Ideal
Line for Busy Chicago People**

The sixty miles of tunnels beneath the streets of Chicago, as shown in the map below, enables the large jobbers to transport goods between railroad stations and between industries having tunnel connections in a safe and expeditious manner. Elevator shafts are constructed from the basement level to the tunnel level and subway cars are placed on the elevators and run to any floor desired, thus minimizing the handling of merchandise.



This system of tunnels enables contractors to remove excavations during all seasons and stress of weather without inconvenience or delay. As high as 2100 cubic yards of excavation has been removed from one foundation plot within twenty-four hours as compared with 420 cubic yards by team. It has been freely demonstrated that by using the tunnel facilities caissons for new buildings can be put in without interruption to overhead work and before the old building is torn down.

By-passes are built from the main tunnel to pits where coal is dumped from subway cars and carried by mechanical appliances to the coal bins and to the boiler room. This system insures a positive and speedy delivery of coal without annoyance to tenants or the public from dirt or coal dust; it also greatly reduces the congestion of heavy and cumbersome coal wagons in the downtown district.

For the convenience of shippers not having tunnel connections, and to reduce the long team haul to railroad depots, there have been provided Universal Freight Stations located at the following points:

169 West Jackson Blvd., between Desplaines and Halsted Sts.

Dearborn Ave. and North Water St.

406 North Water St.

THE CHICAGO C

A Corporation which has been o

A Half Century o

THE history of the last fifty years of Chicago building, which virtually means the history of Chicago, cannot be written without reference to the Chicago City Railway Company.

Not only has this corporation been chiefly instrumental in developing the great south side with its enormous real-estate and commercial values, but it has been a determining factor in expanding the retail trade of the city as a whole.

The State Street line of the company was opened to Twelfth Street on April 25, 1859, more than a half century ago. It was a great day for early Chicago. At that time, a crude horse car, costing perhaps not more than \$500, was operated over a mile of track. Hay strewn on the car floor constituted the winter robe of pioneer luxury in street railway travel, and the fare charged was five cents. Today, a palace car, costing \$6,800, running over track and roadbed costing \$40,000 a mile, and manned by the highest paid street railway trainmen in the United States, will carry you a maximum distance of 25 miles for the same price. Four of the old-time "bob-tail" cars could easily be accommodated inside one of the modern pay-as-you-enter cars of the Chicago City Railway Company, while the new coach is propelled by more than 100 times the power of the early conveyance.

The latest standard car of the City Railway Company represents the highest skill in street

CABLE TRACK

All old cable track (34.71 miles) has been removed and replaced with modern electric track, in full compliance with "immediate rehabilitation" requirements of ordinance of Feb. 11, 1907.

ELECTRIC TRACK

Sixty-one miles of electric track rebuilt in compliance with "immediate rehabilitation" requirements of ordinance of Feb. 11, 1907.

POWER SUPPLY AND DISTRIBUTION SYSTEMS

(a)—5 substations in service—total capacity 43,700 K. W.

(b)—Underground conduit, 430 miles constructed.

(c)—Underground feeders, 166 miles constructed.

(d)—Trolley wire, 143 miles renewed.

(e)—Return feeder, 75 miles installed.

CAR HOUSES

4 modern car houses completed—total capacity, 1,076 double-truck cars.

ROLLING STOCK

350 modern double-truck cars purchased and remainder of passenger cars thoroughly overhauled.

STEEL WHEELS

The Company has replaced its cast-iron

wheels with roller reducing to a minimum "flat" wheels.

FENDERS AND TR

The Company is e life-guard or fence highest markings at Schenectady ar der, with truck gu the reduction of standing an increa operated by the show a steady deg fatal accidents.

The Chicago City Railway Company and the City of Chicago are legally constituted business partners, the city receiving 55 per cent of the Company's net receipts. The Company relies for its future success upon public support because its business is a public business. It is in the transportation field as a builder and developer of general business interests and general municipal

CHICAGO CITY RAILWAY CO.

One of the Largest Contributors to Chicago Building

railway construction. It is provided with wide, comfortable seats, it is equipped with electrical heaters, and the pay-as-you-enter method of fare collection relieves passengers of all the old-time jostling, discomfiture and confusion due to frequent passing of the conductor through the car. Platforms are vestibuled for the protection of trainmen, and the conductor at all times commands a full view of the rear platform from which all passengers enter the car, thus minimizing the most prolific class of accidents.

The Chicago City Railway Company is giving the best service in the world—an achievement which is made possible because of the fact that every department of its activity is first class and up-to-date. The car on track is the apex of the system, but at its base are modern car-houses, car shops, repair shops, sub-stations for electrical distribution, a car-dispatching organization and a miscellaneous equipment—all of which have been assembled together along lines of scientific rail-roading.

The Company has expended on rehabilitation work upwards of \$17,000,000, of which more than \$15,000,000 has been invested since Feb. 1, 1907, on which date its present franchise ordinance became effective. The following recapitulation describes the principal improvements made by the Company in the last three years:

MISCELLANEOUS EQUIPMENT

With the most complete repair shops of their kind in the country, the City Railway is prepared to make prompt repairs on its rolling stock and to keep its cars in excellent condition. The miscellaneous equipment of the Company also includes 12 sprinkling cars, 2 40-ton electric locomotives and a snow-fighting equipment consisting of 5 power plows, 30 sweepers, 54 trail plows, and 26 single-truck cars with snow-wing attachments.

CAR DISPATCHING

The Company has a complete system of

car-dispatching, which insures greater flexibility in the movement of cars and which enables the management to regulate their movement as nearly as possible in accordance with the actual demands of the traffic.

INSURANCE

All insurable property of the Company is insured at its full value. The fact that the insurance rate has been reduced from \$2.22 per \$100 in July, 1905, to 48 cents in November, 1909, attests the high character of construction work performed by the Company.

prosperity, and in this capacity it invites the co-operation of all other builders whose efforts, united, will lift the Chicago of 1910 as far above its present level as the half century last past has raised it above the plane of pioneer days.

CHICAGO PASSENGER TERMINAL



CHICAGO & NORTH WESTERN RY.
CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA RY.
PIERRE, RAPID CITY & NORTH WESTERN RY.
WYOMING & NORTH WESTERN RY.

{ The North Western Line

The Portal of the West

The New Passenger Terminal of the Chicago and North Western Railway at Chicago is to be one of the finest monuments ever erected to the commercial life and spirit of the west.

Hundreds of trains arriving at and departing from this terminal every day, will connect Chicago with thousands of western cities, towns and villages.

More than \$20,000,000 is being expended to provide a railway entrance to the city, through which passenger traffic to and from the territory that has made Chicago powerful and rich is to move in ceaseless activity.

Work upon the new station is proceeding with all the rapidity that skill and liberal expenditure can command.

The new station will have a capacity for handling a quarter of a million patrons daily.

It is confidently asserted that its provisions for doing this expeditiously and with the greatest comfort will excel anything ever known to the traveling public.



The Best of Everything

TICKET AND FREIGHT OFFICE

212 Clark Street

Telephone Central 721

Chicago, Ill.



LA SALLE STATION, CHICAGO

used by

Rock Island Lines

and the Lake Shore and Michigan Southern Ry., Chicago and Eastern Illinois R. R.
and New York, Chicago and St. Louis R. R.

More cities and towns can be reached from this station *without* change of cars than from any other railway terminal in the United States.

La Salle Station is in the heart of the business district, the most centrally located as well as the finest passenger station in the city.

It is the only station on the elevated railway loop, thus all parts of Chicago are brought to its doors. From its portals, through trains and through cars depart daily for such widely separated and remotely situated points as

New York
San Francisco
Kansas City
Albany

Sioux Falls
Ft. Worth
Denver
St. Joseph

Jacksonville
Salt Lake City
Omaha
Atlanta

El Paso
St. Paul
Tucson
Boston

Minneapolis
Colorado Springs
Des Moines
Buffalo

with direct connections for Houston, Galveston, New Orleans, Mobile, Montgomery, City of Mexico, San Diego, Seattle, Portland, Spokane, and hundreds of important cities in the West, Southwest, South and Southeast. These facilities and superior train service throughout the fourteen Rock Island States and beyond are at your command by addressing our nearest representative.

W. J. LEAHY, General Passenger Agent, Chicago

GEO. H. LEE, General Passenger Agent, St. Louis

L. M. ALLEN, Passenger Traffic Manager, Chicago

Locations *for* Manufacturing Plants

of all kinds
on the

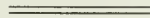
Illinois Central Railroad

in Chicago territory
both South and West of City

The Calumet District

is particularly attractive for

IRON AND STEEL PLANTS



For full particulars, address J. C. CLAIR, Industrial Commissioner,
I. C. R. R. Co., Chicago

Down the Trail Grand Canyon of Arizona

This titanic gash in the earth's crust is a mile deep, many miles wide, 217 miles long, and painted like a sunset.

See the Grand Canyon this season, en route to or from winterless California, on the

California Limited

Carries a Pullman for the Canyon.

Two to five days' time, \$6.50 railroad fare, a reasonable hotel bill at El Tovar (management of Fred Harvey) and a few dollars for rim and trail trips—that's all the extra expense.

Write me for illustrated booklets—"Titan of Chasms," "El Tovar" and "California Limited."

W. J. BLACK, Pass. Traffic Mgr.
A. T. & S. F. Ry. System,
1071 Railway Exchange,
Chicago



BEST TRAINS

BETWEEN

Chicago and St. Louis

VIA

C. & E. I.

DAY AND NIGHT

<u>LEAVE</u>	FROM CHICAGO	ARRIVE ST. LOUIS
After <u>Breakfast</u>	11 35 a.m. . . .	7 35 p.m.
	9 10 p.m. . . .	7 07 a.m.
	11 33 p.m. . . .	7 48 a.m.
	FROM ST. LOUIS	ARRIVE CHICAGO
After <u>Supper</u>	9 01 a.m. . . .	5 01 p.m.
	9 03 p.m. . . .	6 58 a.m.
After <u>Theatre</u>	11 30 p.m. . . .	7.45 a.m.

All trains leave from and arrive at the La Salle Street Station, Chicago, the handiest depot in Chicago—the only station on the Loop of the Elevated Railroad—in the very heart of the business, hotel and theatre district.

At St. Louis all trains arrive at and depart from the Union Depot.

Chicago & Eastern Illinois Railroad



A. B. SCHMIDT, G. A. P. D.
 91 Adams Street, Chicago
 'Phone Cent. 4446

TICKET OFFICES
 La Salle Street Station
 'Phone Harrison 1408

Baltimore & Ohio

CHICAGO

1874 1910

SPLENDID VESTIBULED TRAIN SERVICE

BETWEEN

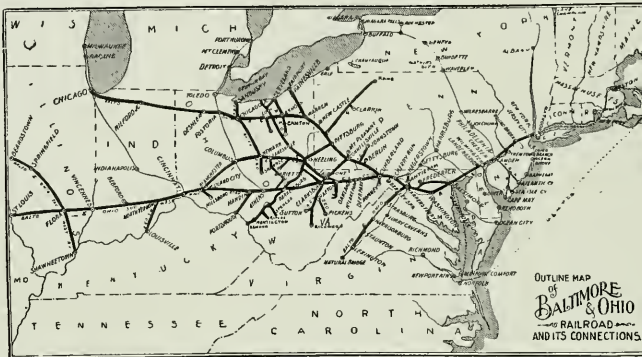
CHICAGO and PITTSBURGH—3 Daily Trains Each Way.

CHICAGO and WASHINGTON, BALTIMORE, PHILADELPHIA and NEW YORK—2 Daily Trains
—Via Pittsburg and Via Newark.

CHICAGO and CLEVELAND—Through Sleeping Cars Daily.

CHICAGO and WHEELING—2 Daily Trains Each Way.

PULLMAN DRAWING ROOM SLEEPING CARS—A LA CARTE DINING CAR SERVICE



QUICK DISPATCH FREIGHT SERVICE

“QD” No. 94, East Bound

From CHICAGO

To NEW YORK, 60 Hours To PHILADELPHIA, 52 Hours
To BALTIMORE, 48 Hours

“QD” No. 97, West Bound

To CHICAGO

From NEW YORK, 60 Hours From PHILADELPHIA, 56 Hours
From BALTIMORE, 52 Hours



BALTIMORE & OHIO PASSENGER STATION
Fifth Avenue and Harrison St., Chicago

C. S. WIGHT
General Traffic Manager

B. N. AUSTIN
Gen. Pass. Agent, Chicago
C. W. BASSETT
Gen. Pass. Agent, Baltimore
C. H. HARKINS
Gen. West. Frt. Agt., Chicago
O. A. CONSTANS
Gen. Freight Agt., Pittsburg
T. W. GALLEHER
Gen. Freight Agt., Baltimore



BALTIMORE & OHIO FREIGHT STATION

Chicago Railways Company

Carries 1,200,000 passengers daily over a network of 316 miles of track, reaching every part of the north, northwest, west and southwest districts of Chicago—three-fourths of the city's area and population.



BY the expenditure of over \$22,000,000 the CHICAGO RAILWAYS CO. has practically rebuilt its system. It has constructed 177 miles of new track costing approximately \$50,000 a mile. It has equipped its lines with 650 new Pay-as-You-Enter cars of the most modern type, costing \$6,000 a car. It expects, in the near future, to receive 350 additional cars of this type, which now are under construction. It has erected a dozen or more new car stations, shops, electrical sub-stations and other great buildings. It will expend several millions of dollars more this year, completing its rehabilitation requirements. Under its partnership arrangement with the city, the CHICAGO RAILWAYS CO. has paid Chicago in two years, \$1,753,205 or 55% of its net receipts and will pay the city \$840,000 this year, it is estimated.



PEOPLES GAS BUILDING

Chicago's latest and best type of office building

H. M. BYLLESBY & COMPANY

Engineers — Managers

Design Construct Operate

Artificial Gas Systems

Street Railways

Water Works

Electric Light Plants

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Water Power Plants

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EXAMINATIONS — REPORTS

**218 LA SALLE STREET
CHICAGO**

Burlington Route

"The 'On Time' Road"

Runs Limited, Electric-Lighted
Through Trains

To
Kansas City
St. Paul
Minneapolis
Omaha
St. Joseph
Denver
Butte
Helena
Spokane
Tacoma
Seattle
Portland

and
Hundreds of
Intermediate
Points

☪ For many years the trains of the Burlington Route have arrived at their destination "on time" with such great regularity that the road has become familiarly known among its regular patrons as the "on time" road.

☪ Physically there is no better railroad than the Burlington. 100 per cent—the entire line—is equipped with safety block signals; the cars, the motive power and the road bed are the best.

☪ Its through trains are brilliantly electric-lighted throughout and have every travel comfort and convenience.

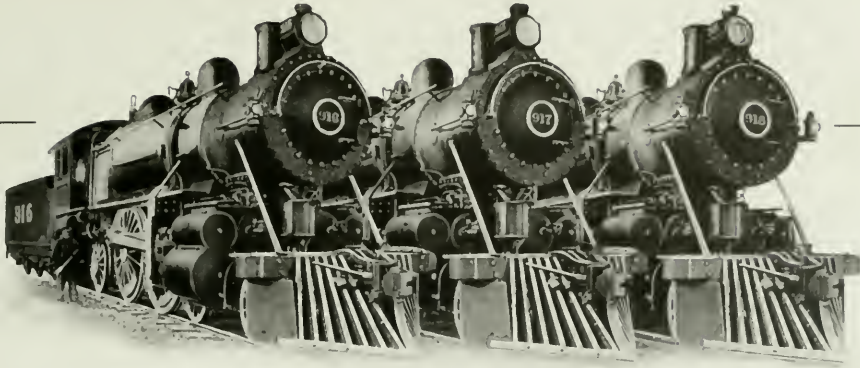
Use the Burlington, "The 'On Time' Road" next time you go West, if you want a safe, easy, comfortable ride and almost certain assurance of arrival at destination "right on time."

For time tables and information address City Ticket Office, Burlington Route, 211 Clark Street, Chicago. Phone Randolph 3117.

P. S. EUSTIS, Passenger Traffic Manager
209 Adams Street, Chicago



"The 'On Time' Road"



On your trips from Chicago to the North, Northwest, West or Southwest, you will secure an elegance in service and equipment unsurpassed in America if you travel via the lines of the

Chicago, Milwaukee & St. Paul Railway

The Pioneer Limited to St. Paul and Minneapolis—the natural selection to the Northwest—leaves Chicago 6.30 p.m. daily. Five other daily trains to the Twin Cities.

San Francisco "Overland Limited" to California via Omaha in less than three days, leaves Chicago 7.00 p.m. daily. Has through standard sleepers Chicago to San Francisco.

The China and Japan Fast Mail to California, leaves Chicago 10.10 p.m. daily. Has standard and tourist sleepers.

The Southwest Limited to Kansas City, ranks first among the Chicago-Kansas City trains, leaves Chicago 6 p.m. daily.

The Colorado Special to Denver via Omaha, offering a one-night-on-the-road trip, leaves Chicago 10.30 a.m. daily, arrives Denver 1.30 p.m. the next day. Another train to Colorado at 10.10 p.m. daily.

The Copper Country Limited to the copper country of Upper Michigan will prove a good selection when your trip is in that direction. Leaves Chicago 10 p.m. daily. Standard sleepers Chicago to Calumet, Mich., and Milwaukee to Marquette, Mich., via Champion and D. S. S. & A. Ry., and Chicago to Calumet, Mich., via McKeever and Copper Range R. R.

All trains of this Railway in Chicago leave from and arrive at
Union Passenger Station, Canal Street.

J. H. HILAND
Vice President
Chicago

F. A. MILLER
General Passenger Agent
Chicago

Chicago & Western Indiana R.R.

— AND —

The Belt Railway Co. of Chicago

H. G. Hetzler, President
J. M. Warner, General Manager
R. W. Stevens, Superintendent
M. J. Clark, Secretary and Auditor
M. J. Murphy, Asst. Secretary and Asst. Auditor
John E. Murphy, Treasurer

Frank A. Spink, Traffic Manager
Edward H. Lee, Chief Engineer
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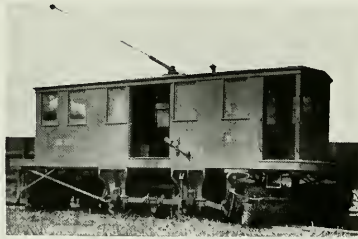
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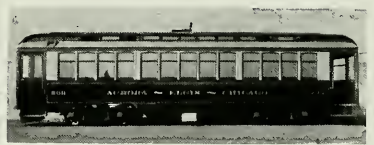
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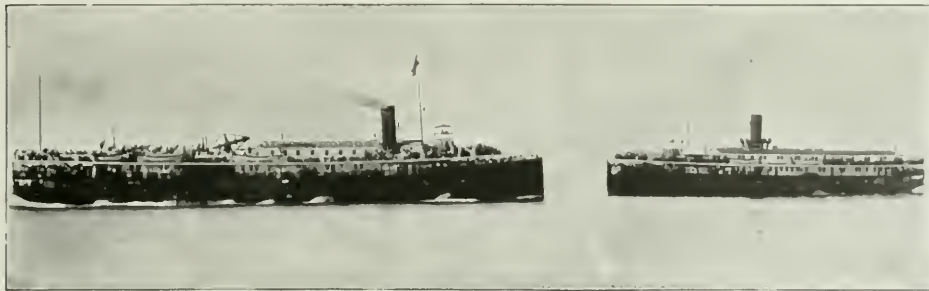


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History of the Graham & Morton Line

THE Graham & Morton Line was started by J. S. Morton with a chartered steamer in 1874, the co-partnership of Graham & Morton being formed by J. H. Graham, Andrew Crawford and J. S. Morton during the winter of 1875.

They bought their first steamer, the Messenger, 244 tons net, with 22 first class passenger rooms, of the Engleman Transportation Co. in February, 1875. This company continued the operation of this single steamer until the spring of 1880, at which time Mr. H. W. Williams, owner of the propeller Skylark, 166 net tons, with 18 staterooms, then operating an independent opposition line between Benton Harbor and Chicago, was taken in and the stock company under the name of The Graham & Morton Transportation Company was organized. The stockholders were H. W. Williams, J. H. Graham, Andrew Crawford and J. S. Morton, with a capitalization of \$50,000.00.

This company remained in full force up to and including the present time, Mr. H. W. Williams withdrawing from the company by mutual agreement and taking out the steamer St. Joseph as his proportion of the stock, which he afterward ran from South Haven.

Mr. Andrew Crawford remained a stockholder of the company until his death in 1901, when his stock was bought up by the remaining stockholders. Mr. J. H. Graham remained a stockholder and president of the company until his death, in 1907. His holdings in the company were then turned over to an administrator, Mr. J. S. Morton, to be divided equally between his mother and his wife.

Mr. J. S. Morton was elected president and treasurer of the Graham & Morton Transportation Company at this time, continuing as manager of the company up to and including this date.

The steamers Messenger and Skylark were run together for two years. At the end of 1881 the Skylark's upper works were taken off and she was changed into a steam barge, and the steamer Lora, with a capacity of about 700 tons net, was built during the winter of '81 and '82; running on the route with the Messenger in 1882. In the fall of 1882 the Messenger was sold to Smith & Adams of Mackinac City, and the steamer St. Joseph, 500 tons net, was built and run in connection with the Lora during 1883, 1884, 1885 and 1886.

The following winter the first steamer Puritan was built, coming out in the spring of 1887, running with the steamer Lora, the two being the only steamers on the route for the years up to and including 1889 excepting that the Detroit and Cleveland Steamboat Co. sent their steamer City of Detroit here to run during the season of 1889 in opposition to this company.

In the fall of 1889 the steamer Lora was sold and the side wheel steamer City of Chicago contracted with F. W. Wheeler & Co., of West Bay City; this latter steamer coming out in the spring of 1890

and running in connection with the steamer Puritan during that year and the next.

At the end of 1891 the steamer Puritan was sold and the steamer Chicora contracted with the Detroit Shipbuilding Co. to be delivered before the 1st of June, 1892. Owing to miscalculations the Chicora did not come out until the last of August, and during the fore part of the year the steamer Arundel was chartered and ran in connection with the steamer City of Chicago. The steamers Chicora and City of Chicago formed the line (running together) between St. Joseph and Chicago, making a round trip and a half apiece, three trips a day, through July and August, during the years 1893 and 1894. In January, 1895, the Chicora was lost. During that winter the steamer City of Milwaukee was bought from the Grand Trunk Ry. Co., and, with the steamer City of Chicago, formed the line between St. Joseph and Chicago up to 1904.

In 1901 this company acquired by purchase the interests of the Holland & Chicago line, running steamers from Holland to Chicago, which included the new steamer Puritan and steamer Soo City. The two latter steamers running on that line until 1904 when the Soo City was traded to the Booth Line for the steamer Argo. In 1905 the steamers Holland and Puritan ran together on the Holland line and have continued up to this time.

During the spring of 1903 the side wheel steamer City of Benton Harbor was built by the Craig Shipbuilding Co., of Toledo, Ohio, and has been run on the Benton Harbor route in connection with the steamer City of Chicago from that time to the present, the two steamers making three round trips a day.

The steamer Argo was operated between the two divisions as an independent steamer until the spring of 1905. That year the Argo and the steamer W. H. Gratwick were run from Chicago to Duluth, Lake Superior, in the heavy freight trade, until late in November the Argo, making a trip to Holland during a very severe gale of wind, struck the bar in entering the harbor at Holland and was thrown around onto the beach where she lay the greater part of the winter and was finally taken off by the insurance companies.

In 1906 the steamer P. M. No. 5 and the steamer W. H. Gratwick were run on the Lake Superior division, this division being abandoned at the end of that season. In 1907 the freight steamer City of Traverse was purchased and run through that year and 1908 as occasion required.

Following is a list of the steamers belonging to this company:

Steel side wheel steamer City of Benton Harbor.
Steel side wheel steamer City of Chicago.
Steel side wheel steamer Holland.
Steel steamship Puritan.
Wooden freight vessel, City of Traverse.
Steel harbor tug Bonita.

Benton Harbor, Mich. June 14, 1909.

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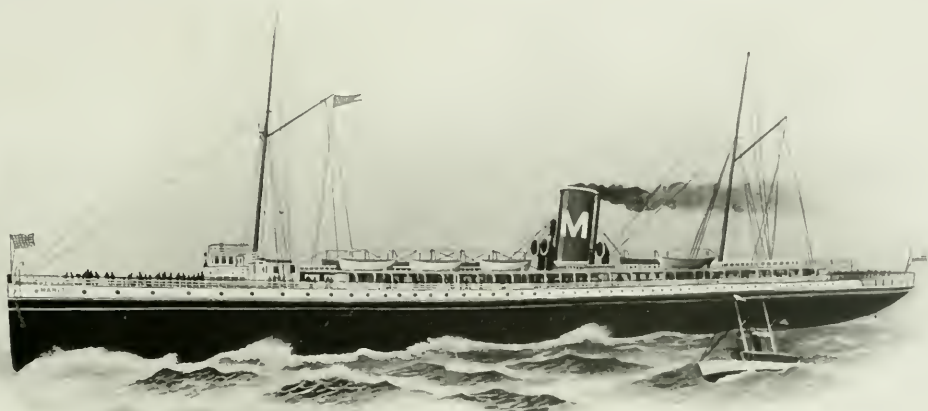
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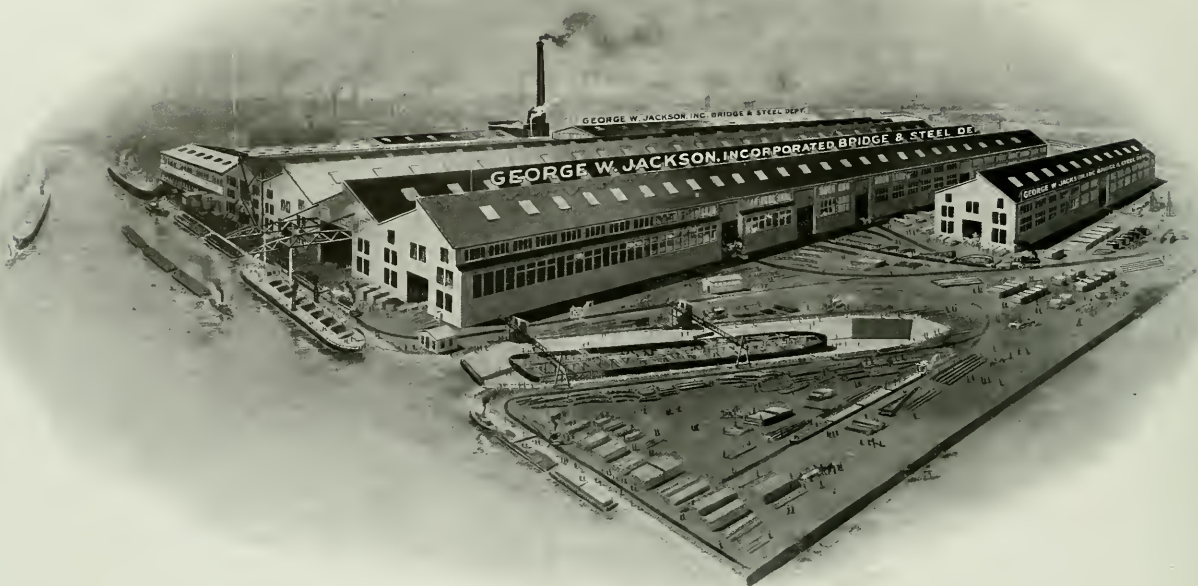
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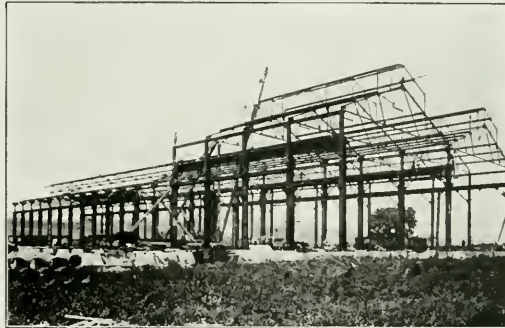
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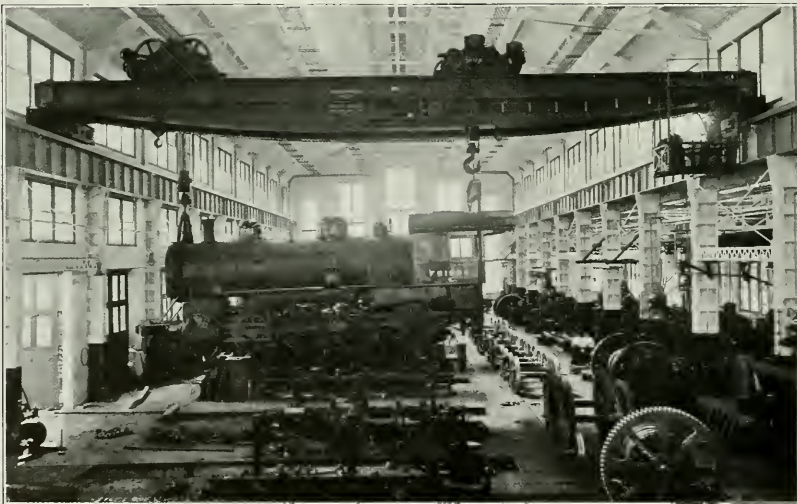
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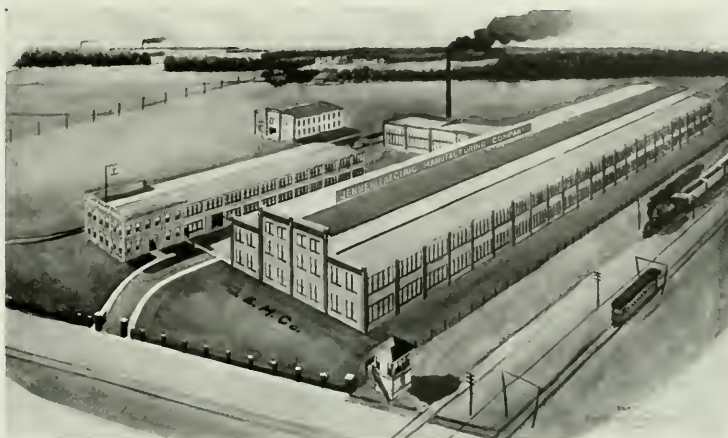
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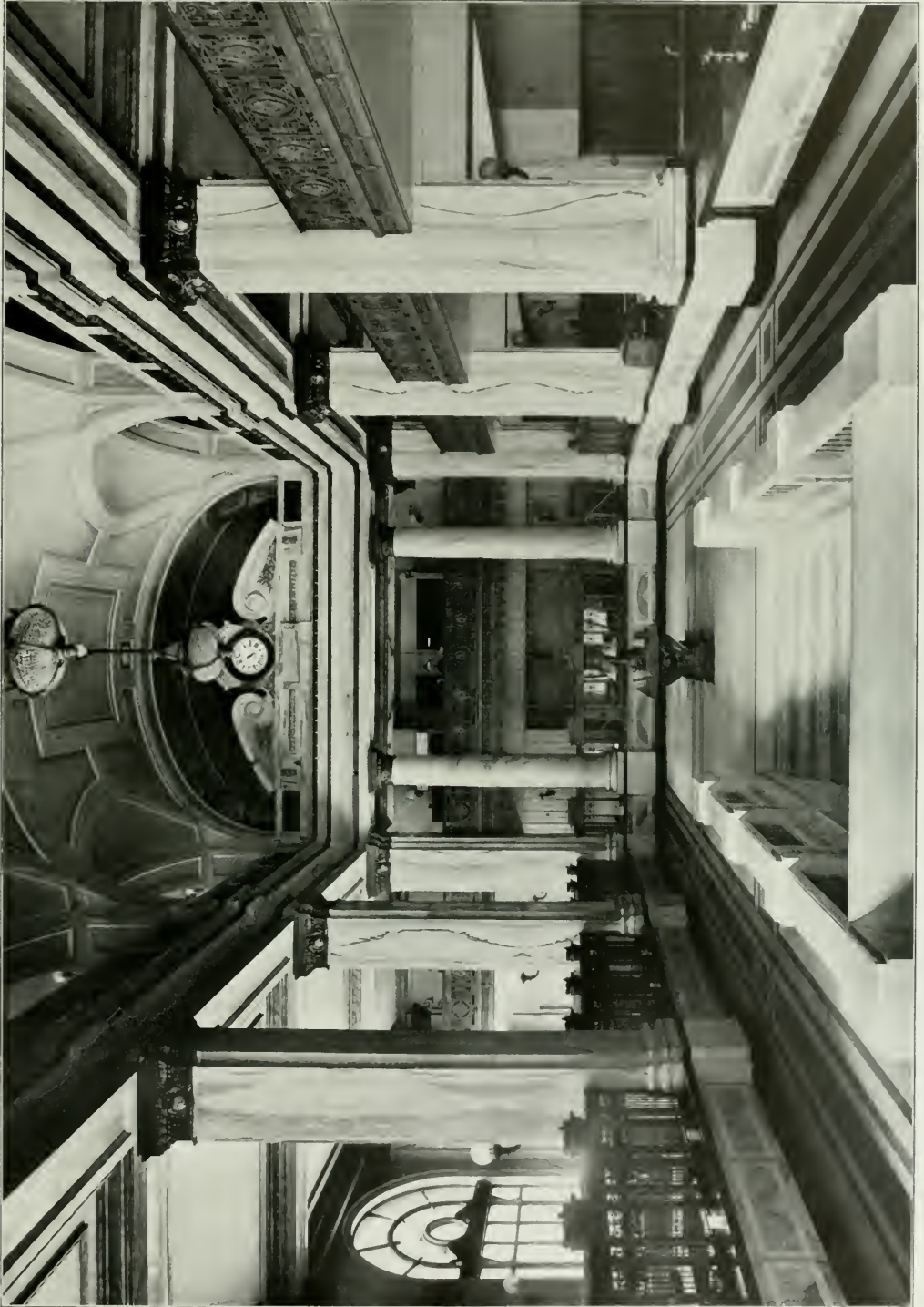
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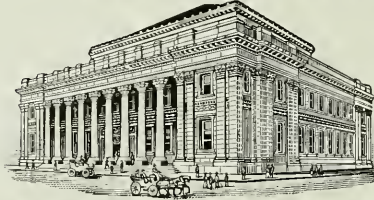
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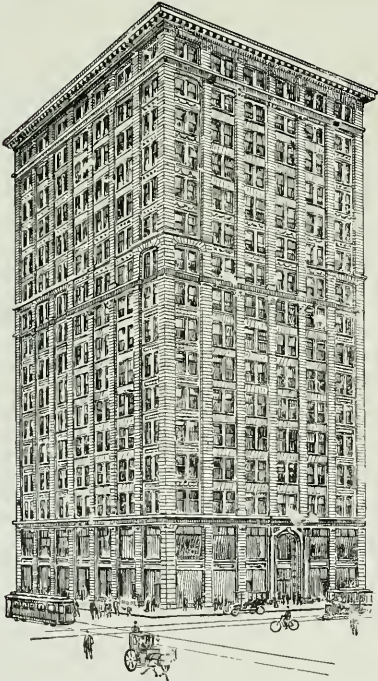


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This Association was organized 18 years ago for the purpose of the industrial development of a tract of land of approximately 4,000 acres situate in Bloom Township, Cook County, 27 miles south of Chicago.

Eighteen years ago this tract of land sustained a farming population of around 150 people. Today there is a thriving manufacturing city of some 16,000 people, with 65 factories, large and small, representing the most diversified industries.

The city of Chicago Heights has a well organized municipal government, 14 churches of various denominations, two newspapers, a free Carnegie library, three banks, two hotels, two telegraph offices, telephone exchange, four railroad depots, three express companies, public warehouse, nine public schools, two cemeteries, gas works and electric light and power plant.

The main attraction, however, for manufacturers to locate at Chicago Heights, is its unrivaled railroad facilities. Five railroads enter the city, two great trunk lines, the Frisco System and the Michigan Central; there are two belt lines, the Elgin, Joliet & Eastern R. R. and the Chicago Terminal Transfer Railroad, affording direct connection with every railroad entering the city of Chicago. In addition hereto, there is a local switch line, constructed by the Land Association, connecting every factory by its own switch track with the various railroads and keeping five modern, powerful switch engines in constant service for the sole purpose of giving the manufacturers prompt service to and from the connecting lines.

In addition hereto, low water taxes, proximity to and direct connection with the coal fields of Illinois and Indiana, together with excellent transportation facilities offered by a local street car line and two important interurban lines, serve to make Chicago Heights one of the best, most economical and convenient manufacturing centers in this country. In addition to the factories already operating at Chicago Heights, there have been five new ones located last year, the principal one being the Inter-Ocean Steel Company, which is erecting a large plant at an expense of nearly two million dollars.

Since its inception, Mr. Charles H. Wacker has served as President and Treasurer of the Association and, during most of the time, Messrs. Rudolf Brand and Francis Lackner as its Vice-President and Secretary respectively. Its Board of Directors, in addition to the above mentioned gentlemen, consists of Messrs. Leo Fox and Edward G. Uiblein. Since 1892, Mr. Martin H. Kilgallen has been its General Manager.

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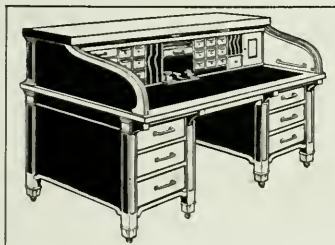
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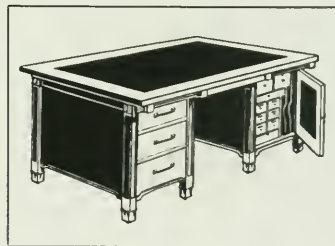
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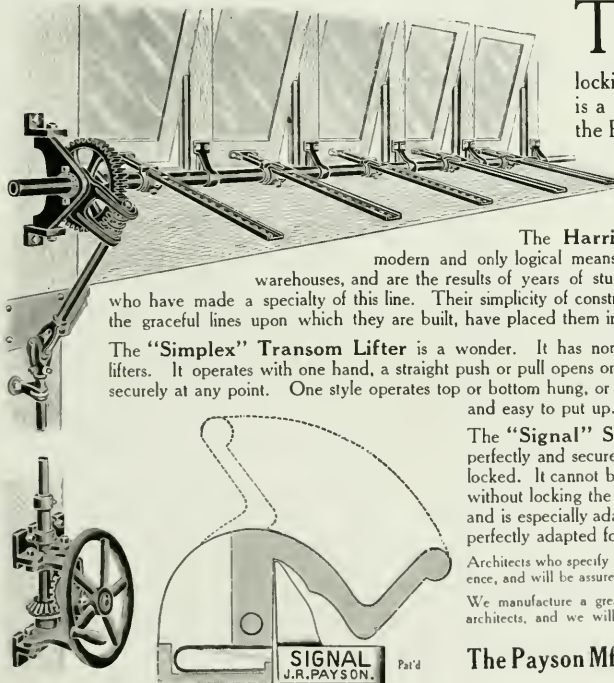
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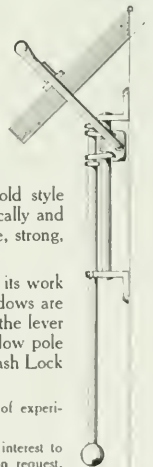
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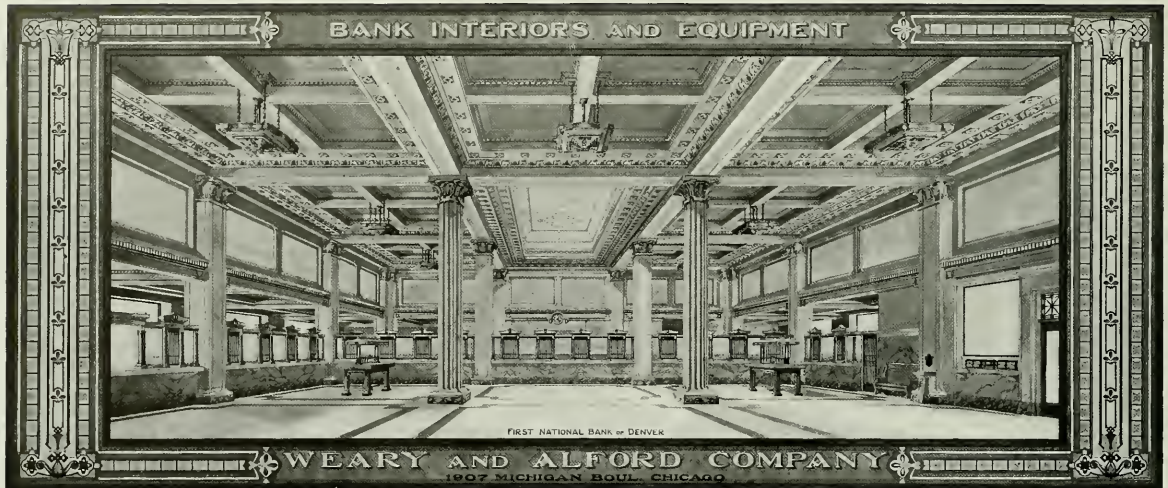
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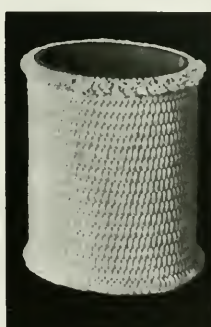
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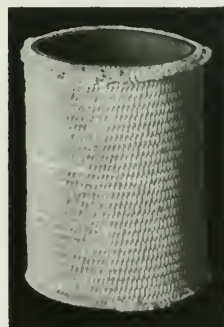
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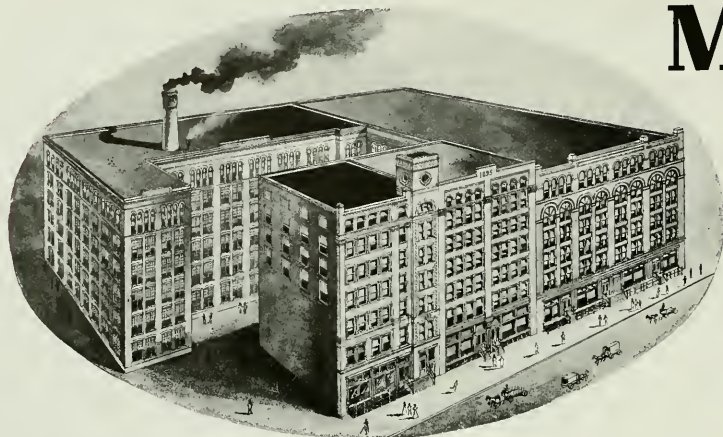
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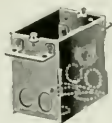
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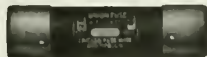
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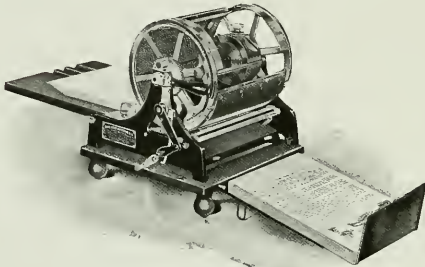
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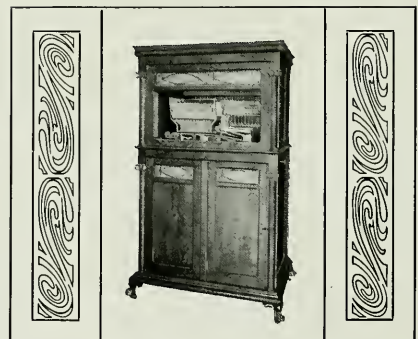
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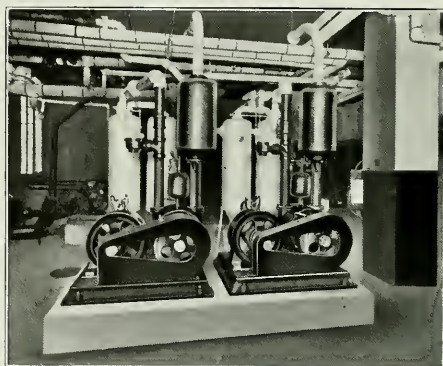
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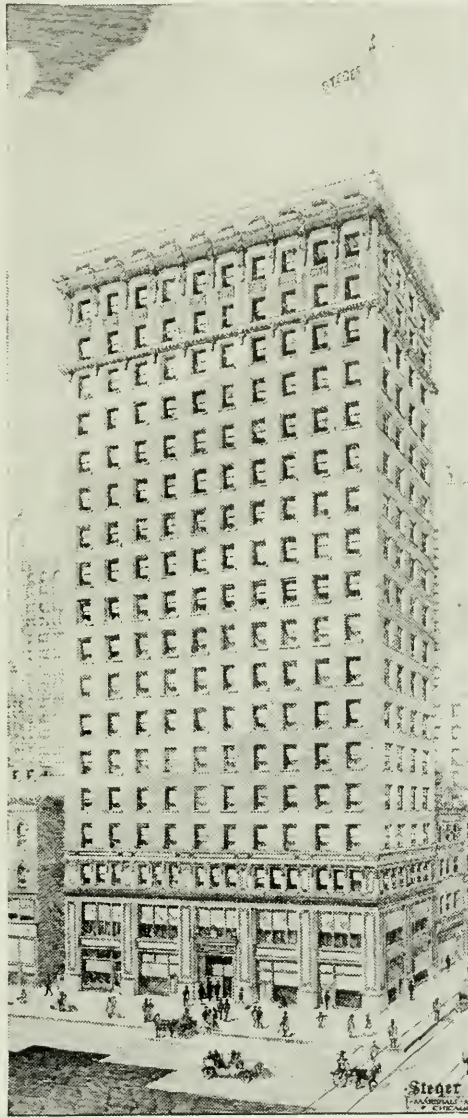
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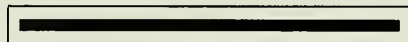
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Cabell County (W. Va.) Court House, Huntington
DePage County (Ill.) Court House, Wheaton
Clinton County (Ia.) Court House, Clinton, Ia.
Bay City (Mich.) Court House and Post Office
Clarksville (Tenn.) Post Office
Monon Freight House, Chicago, Ill.
Montgomery (Ala.) Union Passenger Station
C. E. & Q. Freight House, Chicago, Ill.
Nashville Union Depot, Nashville, Tenn.

1004 Chamber of Commerce CHICAGO

Tel. Main 3316

We are well equipped with the latest machinery to erect large buildings
of all kinds and will gladly furnish estimates of cost, and we solicit
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Polk Apartments, Nashville, Tenn.
Warwick Apartments, Philadelphia, Pa.
Buncombe Co. (N. C.) Court House, Asheville
Kalamazoo Paper Mill, Kalamazoo, Mich.
Mingo County (W. Va.) Court House
Hospital for Contagious Diseases, Cook Co., Ill.
Lee Paper Mill, Vicksburg, Mich.
Mac-Sin-Bar Paper Mill, Otsego, Mich.
Buick Motor Factory, Flint, Mich.
Weston-Mott Factory, Flint, Mich.
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The New 6,000-Yd. Stone Crushing Plant of the Dolese & Shepard Company. Machinery throughout installed by us

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Grain Elevators, Flour Mills, and Complete Plants for handling Coal, Sand, Gravel, Ores, Ashes, and all kinds of Merchandise.

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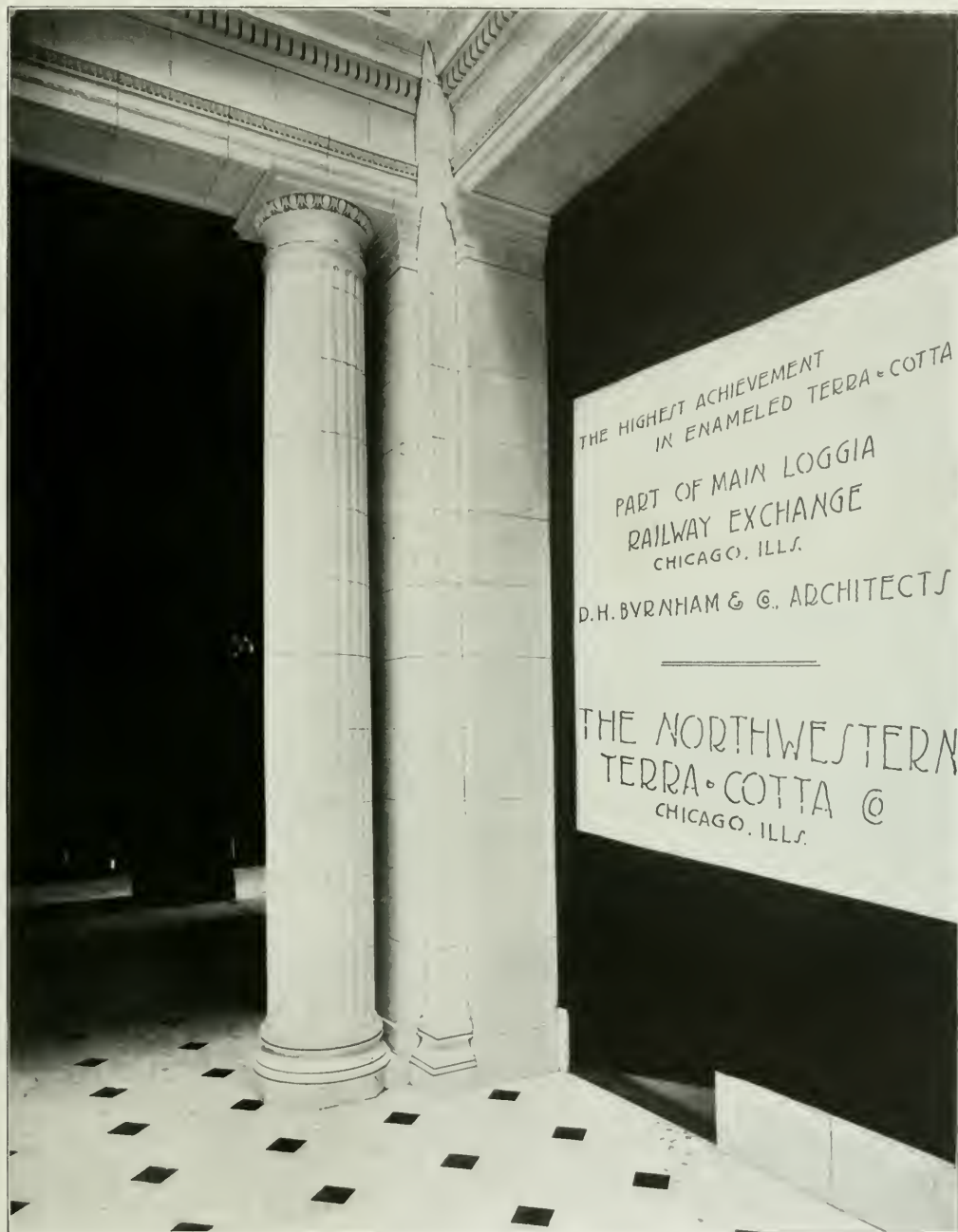
ALL CLASSES AND SIZES

The Mills of this Company are equipped with the most modern machinery obtainable. Our capacity is large. We have striven to handle all orders to the COMPLETE satisfaction of our customers, and our ever-increasing business proves our success.

We will gladly furnish any estimates

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LEHIGH PORTLAND CEMENT

Guaranteed for
Uniformity, Strength and
Durability



Recommended for
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Capacity

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CHICAGO PORTLAND CEMENT CO.

MANUFACTURE

"Chicago AA" Portland Cement

Main Office - - - - - 108 LA SALLE STREET, CHICAGO, ILL.



Factory at Oglesby, Near La Salle, Ill.

PRODUCT

"CHICAGO AA" is a Portland Cement of the HIGHEST QUALITY.
"THE BEST THAT CAN BE MADE."

Always reliable for fineness, strength, prompt hardening and uniform color.

Color—A most desirable and pleasing light bluish gray is one of the attractive features of this cement.

In soundness, strength, setting, hardening, fineness and all other qualities required by the Standard Specifications adopted by the American Society for testing materials this cement more than meets the demands.

THIS CEMENT IS MADE FROM ROCK AND CLAY.

The immense deposits of lime rock and clay on the Company's extensive land holdings at Oglesby, Ill., excel in all of the essentials that produce the best Portland cement that can be made.

FACILITIES

The quarry is largely operated by electric power which drives rock drills, crushers and tramway. Steam shovels dig up the blasted rock and load the cars which are hauled by locomotives to the crushers.

Fireproof buildings house the most perfect and modern equipment for manufacturing.

Turbine steam engines and compound condensing engines furnish power which is electrically transmitted. Ball mills, Komminuters and tube mills grind the raw materials and rotary kilns burn it. Kent mills and tube mills grind the clinker to finished cement.

Fireproof stockhouses of reinforced concrete hold the finished cement, and are equipped with unexcelled apparatus for conveying, sacking and loading.

Railroads having independent tracks upon the premises are: Illinois Central; Chicago, Burlington & Quincy, and the Chicago, Milwaukee & St. Paul. The Chicago, Rock Island & Pacific Railroad is reached by switching three miles to La Salle.

CAPACITY

The output is now 1,250,000 barrels per annum.

Commenced the present plant in 1898 and have had eleven years of constantly increasing business and expansion.

"CHICAGO AA" PORTLAND CEMENT has been used exclusively in many important concrete constructions such as

Thebes Bridge, over Mississippi River, Thebes, Ill. (53,300 bbls.).

New City Hall, Chicago, (25,000 bbls.).

Reinforced concrete bridges at Kankakee, Ill.; Kenosha, Wis.; Cedar Rapids, Iowa, and many smaller ones; Government postoffices at Sreator, Ill.; Elgin, Ill.; Clinton, Iowa; Janesville, Wis.; Monmouth, Ill.

Government Locks on Hennepin Canal and at Moline, Ill.

Government Arsenal Buildings at Rock Island.

Public Libraries at Freeport and Kankakee.

Over 100,000 barrels by various Railroads.

And the principal dealers, contractors, block and tile manufacturers are customers.

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Universal Portland Cement Co.

CHICAGO — PITTSBURG

Daily Output 23,000 Barrels

PLANTS AT CHICAGO AND PITTSBURG



Universal Portland Cement Co. Plants Nos. 3 and 4, Buffington, Indiana



Universal is a strictly true Portland cement of the highest quality possible to manufacture. It is made from granulated blast furnace slag and limestone burned to a hard clinker in rotary kilns and is absolutely free from sulphides. The limestone used is practically pure calcite. The slag is a siliceous material, clean, free from impurities and always uniform and identical in composition and character.

Universal Portland Cement is the only Portland cement manufactured from a slag limestone mixture in this country, and its present annual production considerably exceeds ten per cent of the total yearly output of Portland cement in the United States.

Universal was first placed on the market in 1900; since that time the demand has been so great as to necessitate continual enlargements of capacity. The shipments in 1908 exceeded four million five hundred thousand barrels an output nearly double that of the entire production of the United States in 1896. The total output of the Company is now twenty-three thousand barrels per day. Plant No. 6 at Buffington, Ind., is now under construction, and when completed, the Company will have an annual output of 10,000,000 barrels.

Universal is suitable for every class of concrete work in which a high grade Portland cement is used. Millions of barrels have been used with eminent success in sidewalks, floors, piers, dams, general engineering work, United States Government, State, Municipal and Railroad work and building construction under all possible conditions. Universal will meet all usual and proper tests and conforms generously to the Standard specifications for Portland cement as adopted by the American Society for Testing Materials and to the specifications of the Engineer Corps of the United States Army. Universal is exceptionally uniform in color and strength, thoroughly sound, absolutely regular in setting qualities and always reliable.

Thousands of barrels of Universal are used annually in the City of Chicago. The two principal traction systems of Chicago alone use several hundred thousand barrels annually. During the past year the C. & N. W. R. R. used over four hundred thousand barrels in their concrete work in this city. One hundred thousand barrels were used in the Montgomery Ward Building, the largest reinforced concrete structure in the world. Universal Portland Cement was used in the Railway Exchange Building, the new University Club Building, the new Blackstone Hotel, the new McCormick Building, the Born Building, and in numerous other structures of prominence in and about Chicago.

The location of the plants with reference to transportation facilities, the immense output and the large storage capacity, permit of the most satisfactory service in making prompt shipments of orders. The western plants are reached by all railroad lines running out of Chicago, and the plant at Universal, Pa., is located on the Union Railroad through which connection is made with all lines entering Pittsburgh. In addition to these connections all points upon the Great Lakes are accessible by water.

Uses of TERRA COTTA HOLLOW TILE in Standard Fire Proof Construction

THE steel frame construction of buildings could never have reached its present tremendous popularity, without the use of Terra Cotta Hollow Tile as a protection against fire, and as a means of constructing fire proof floor spans of sufficiently light weight to permit of the floors being carried to any desired height on a steel frame composed of members so light, and dimensions so small, as to make the entire investment commercially economical.

The first function of fire proofing in a steel frame building is to protect the steel from fire. As an incidental fact, in performing this duty, it also protects the steel from corrosion and rust.

In connection with this duty it spans the spaces between the steel floor beams, thus forming fire proof floor arches which carry the loads placed on the floors of the building in use, and at the same time effectually prevent the spread of fire from one floor to another.

In roof construction, Terra Cotta Hollow Tile answers the same purposes as in floor construction, but as roof loads are naturally much lighter, usually, than floor loads, the steel construction, and consequently the fire proof construction, are much lighter than in floor arches, and the methods of application are frequently different.

The next extremely important use of Terra Cotta Hollow Tile is for the construction of fire proof partitions for subdividing floor area as may be desired in the occupancy of the building, or as may be required for the division of large floor areas to prevent the spread of fire on a single floor. Under the classification of partitions are, of course, included closet and vault walls, enclosures for elevator shafts, etcetera.

The exterior walls of steel frame buildings are usually of brick or stone, through which moisture easily penetrates. To prevent this moisture from reaching and destroying the plaster on the interior, Terra Cotta Hollow Tile Furring Blocks are used. These blocks provide a dead air space through which the dampness cannot go, and the plastering is applied direct to the inner side of these blocks without necessity for any additional furring.

The above catalogs the uses of Terra Cotta Hollow Tile Blocks for steel frame buildings, known as Standard Construction. This material is, however, used in many ways for structural purposes and in reinforced "Long Span" floor construction, and for these purposes the methods of application are fully shown in our catalog of "Long Span Fire Proof Construction," which will be furnished on request.

PITTSBURGH Fulton Building
NEW YORK Flat Iron Building
CHICAGO . . . Commercial National Bank Building
BOSTON John Hancock Building
PHILADELPHIA Land Title Building
WASHINGTON Colorado Building

National Fire I

Capital, Twelve and One-Half Million Dollars

TERRA COT

The largest company in the world devoted solely to the busi

OR

*Some of the Advantages of Standard Fire Proof Construction of **TERRA COTTA HOLLOW TILE** from the Standpoint of Practical and Economical Construction*

INDEPENDENCE OF WEATHER.

Floor Arches of Hollow Tile may be laid at any time of year regardless of weather temperature, rain or snow.

SPEED IN PLASTERING.

Arches may be plastered the day after they are laid, if necessary to rush work.

BRACING FOR STRUCTURE.

Tile Arches assist the wind bracing of the structure because they fill the total depth of the steel beams, and act as horizontal bracing for the entire structure. In comparison with this, concrete floor slabs rest only upon the upper third of the beams, are usually one-third as deep as Tile Arches, can not efficiently transmit the horizontal stresses caused by wind pressure in high buildings, and, by reducing the efficiency of the floors as braces, increase the amount of steel necessary to provide against horizontal stresses.

MINIMUM WEIGHT.

Tile Arches weigh less per square foot than any other form of fire proof floor construction of equal strength, and, consequently, greatly reduce the dead load on the structural steel and foundations.

SOUND PROOF.

Hollow Tile Arches have usually from two to four cells and are therefore excellent non-conductors of sound. An extremely important consideration in hotels, hospitals, office buildings and structures of similar occupancy.

RAPID CONSTRUCTION.

The false work, or centering, required in setting Tile Arches may be removed within twenty-four hours after arches are laid. Centering for concrete floors must, under the most favorable conditions, remain in place at least ninety-six hours, and, in event of constant rain or low temperature weather, must frequently be kept standing two weeks or more, necessitating great delay in completing building, as contractors for other work can not proceed while centering remains in place.

ELIMINATION OF MOISTURE.

The cement mortar joints in Tile Arches dry out rapidly, permitting of the immediate laying of finish flooring and wood trim without risk of damage by moisture. Concrete floors are set in a wet, plastic condition, dry slowly, and the moisture remaining in them frequently causes the warping and buckling of floor finish and trim.

How can you be sure of the best and most economical fire-proofing—or either—unless you figure with the largest company in the world devoted exclusively to the manufacture and erection of fire-proofing for buildings?

Roofing Company
of
HOLLOW TILE

26 Factories Throughout the United States

roof construction in both Hollow Tile and Reinforced Concrete

889

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CINCINNATI Union Trust Building
MINNEAPOLIS Lumber Exchange
LOS ANGELES Central Building
TORONTO, CAN. Traders Bank Building

The Atlas Portland Cement Company

30 Broad St., NEW YORK, N. Y.

WORKS:

Coplay, Pa.
Northampton, Pa.
Hannibal, Mo.
Hudson, N. Y.



Trade Mark

PRODUCT OUTPUT

"Atlas" Portland Cement.

The Atlas Portland Cement Company's works are located at Northampton, Pa., Coplay, Pa., Hannibal, Mo., and Hudson, N. Y., and produce over 18,000,000 barrels of "Atlas" Portland Cement per year.

RAW MATERIAL

The Company's quarries of cement stone have been selected after careful examination, and furnish in perfect form the chemical ingredients necessary in the production of a true Portland cement.

LABORATORY TESTS

Throughout the entire works the greatest care is exercised to keep the product at its high standard, and as a final check all cement is submitted to the laboratory for chemical and physical examination before shipment. The care exercised in this regard has created a reputation for reliability among the users of cement who do not have the time or opportunity to test each shipment, and who consequently rely largely upon the manufacturer.

PACKAGES

"Atlas" Portland Cement is of uniform strength and quality, and made from genuine Portland cement materials only. It contains no furnace slag.

"Atlas" Cement is shipped in barrels, and in duck and paper bags. The barrels weigh 400 pounds gross or 380 pounds net. When shipped in bags the weight is 95 pounds per bag, four bags to the barrel.

PUBLICA- TIONS

The Cooperage Department is thoroughly equipped to produce a barrel which experience has proved to be the most suitable for cement. Each barrel is lined with a specially prepared paper as an extra guard against the possible absorption of moisture.

For the benefit of those who desire to make lasting improvements about the factory, farm or home, and as a guide to those who contemplate new construction, we have published the books noted below:

"Concrete Houses and Cottages." Vols. I and II. These books contain many half-tone cuts (in tint) of photographs, together with floor plans of concrete houses ranging in price from \$1,000.00 to \$450,000.00.

The houses not only show a large variety of design, but are of several different methods of concrete construction. They are not imaginary sketches, but have been built and designed by the best architects in the country. It is the purpose of these books to show what has been and can be done in the way of large and small concrete houses, cottages and bungalows, and that the illustrations and plans may be of material assistance, not only in planning a future home, but in deciding upon the material to be used in its construction. Vol. I, Large Houses; Vol. II, Small Houses. Size 10 by 12 inches. Copies will be sent, express prepaid, upon receipt of \$1.00 per volume.

"Concrete Country Residences" (out of print). Price \$2.00.

"Concrete Cottages." A sixteen-page pamphlet showing photographs, floor plans and specifications for small concrete houses ranging in cost from \$1,500.00 to \$4,000.00. Copies sent free upon request.

"Concrete Construction about the Home and on the Farm." The 1909 edition of this book contains many half-tone cuts from photographs showing several new and practical uses of Portland cement about the home and on the farm, besides full directions for making and handling concrete; also many specifications, sectional drawings, and photographs of the smaller constructions that can be built by the layman. Copies sent free upon request. Cloth bound copies, 25 cents each.

"Reinforced Concrete in Factory Construction." A book containing—besides several general chapters on concrete, concrete aggregate, methods and materials for reinforcement—ten chapters, giving detailed descriptions of ten concrete factories and warehouses erected in various parts of the country by different systems. Photographs, sectional drawings and specifications were furnished by the engineers in charge of the work. This book, profusely illustrated (two hundred and fifty pages, size six and one-half by nine inches), pamphlet bound, sent free upon request to architects, engineers, and manufacturers who contemplate building. Paper cover copies, delivery charges 10 cents. Cloth bound copies, 50 cents each.

"Concrete in Highway Construction." A text-book for highway engineers and supervisors. It contains complete descriptions, drawings and photographs of every phase of highway construction in which concrete plays a part. It is the most valuable book ever published on this subject. Sent free only to highway officials and highway engineers. Price \$1.00.

"Concrete in Railroad Construction." A text-book for railroad engineers, containing detailed description, drawings and many photographs of railroad constructions in which concrete is used. This book will be sent free only to railroad officials and railroad engineers. Price \$1.00.

"Concrete Garages." A valuable book for any one contemplating the construction of a garage. It contains photographs of many fireproof concrete garages, together with drawings and detailed descriptions as to how they may be constructed. Sent free upon request.

PANAMA CANAL CONSTRUC- TION

The United States Government has bought 4,500,000 barrels of "Atlas" Portland Cement for use in the construction of the Panama Canal, the largest order ever placed for Portland cement.

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The first three stories of the La Salle Hotel (the acme of modern building construction) is of "Old Hoosier Stone," from the Old Hoosier Quarry of the Bedford Quarries Company.

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Stone from the Old Hoosier Quarry has been used in some of the largest and most important buildings in this country. Among the most recent are The City Investing Building, New York; State Capitol, Jackson, Mississippi; State Capitol, Frankfort, Kentucky; Main Art Building, St. Louis; Trinity Building, New York; Carnegie Institute, Washington, D. C.; St. Mary's Cathedral, Covington, Kentucky; New Theatre, New York; Cathedral of Immaculate Conception, Denver, Colorado, and all the Chicago University Buildings, Chicago.

Any information relative to this stone for building purposes will be cheerfully given by addressing the nearest office.

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FACILITIES. This Company has sand and gravel washing plants located as follows:

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Janesville, Wis., on C. M. & St. P. R. R.

South Elgin, Ill., on C. & N. W. R. R.

Also 25 yards in Chicago and suburbs with railroad connections for storage of material.

ADVANTAGES. Our large number of yards enables us to deliver material promptly and cheaply.

ESTIMATES. This Company will be pleased to furnish estimates on all kinds of building material for delivery in Chicago and vicinity.



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FACE BRICK IN
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FOR EVERY PURPOSE

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GUARANTEED NOT TO
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No order too small for our attention or too large for our capacity. This
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This Company will gladly furnish
Prices on any Requirements

Chamber of Commerce
CHICAGO

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MANUFACTURERS AND DEALERS

**Sewer Pipe, Wall Coping, Flue Lining, Fire
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**General Line of Masons, Plumbers, and
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Established 1855. Operate three modern manufacturing plants. Forty-five kilns capacity. Five thousand car loads per annum.

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American Sand & Gravel Co.

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CHICAGO**

**Gravel Washers and Sand Pits Located at St. Charles,
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Prices quoted for delivery anywhere in any quantity.

Annual output 1,000,000 yards.

Twelve retail yards within the city limits.

The great saving in the manufacture of concrete by the use of gravel and torpedo sand over the use of crushed stone is fully explained in our booklet, "The Economics of Concrete," mailed on application.

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WILLIAM J. SINEK

CHICAGO : NEW YORK : NEW ORLEANS : BIRMINGHAM

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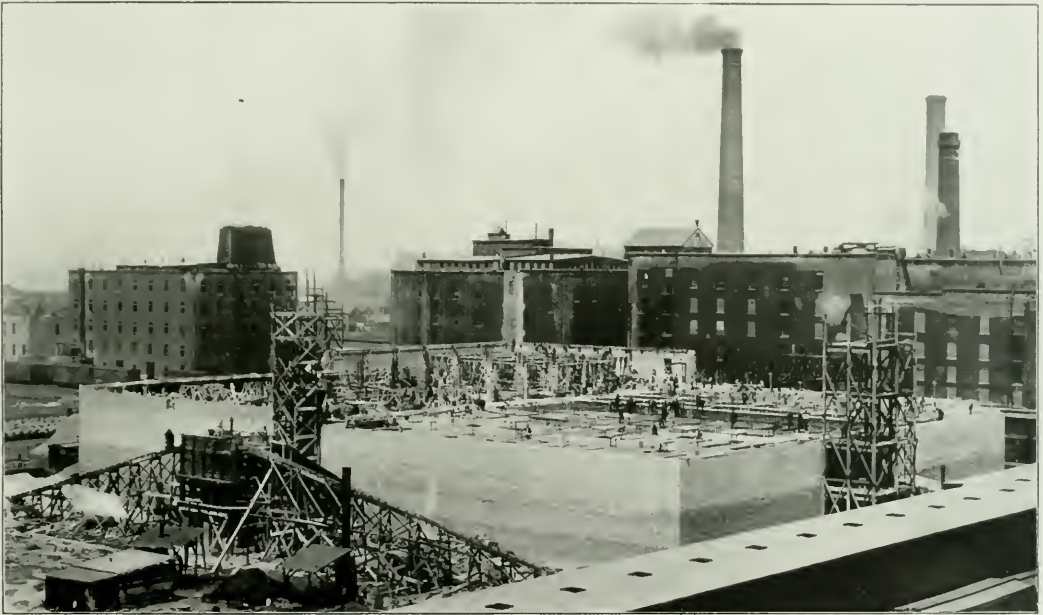
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Reinforced Concrete Floor and Roof Construction of Morris & Company's Cold Storage Building, Union Stock Yards.
Basement, six stories and roof. Area of work, 400,000 square feet. Capacity, 85,000,000 pounds of meat.

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Armour & Co., Power Houses, Chicago.
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Armour & Co., Hog Killing Building, Chicago.
Armour & Co., Hair Curling Building, Chicago.
Armour & Co., Soap Works, Chicago.
Armour & Co., Glycerine Works, Chicago.
Armour & Co., New York Plant.
Armour & Co., Philadelphia Plant.
Armour & Co., Omaha Plant.
Armour & Co., Jackson, Miss., Plant.

Armour & Co., Gary, Ind., Plant.
School of Education, University of Chicago.
Manual Training School, University of Chicago.
Home Herald Building, Chicago.
Ruprecht Building, Chicago.
Harder Warehouse, Chicago.
Hately Warehouse, Chicago.
Home for Aged Jews, Chicago.
Corn Exchange Bank Building, Chicago.
Union Station, Washington, D. C.
Subways, Washington, D. C.

Standard Asphalt & Rubber Company



Producers of High Grade Asphaltic Materials

General Offices, 205 La Salle Street, Chicago, Illinois



600,000 square feet SARCO Waterproofing and SARCO Mastic platforms will be placed in the New Terminal Station of C. & N. W. Ry., Chicago.

PRODUCTS	{	SARCO No. 6 WATER-PROOFING.	SARCO ASPHALTIC CEMENT.	SARCO MINERAL RUBBER.	SARCO WATER AND WEATHERPROOF LIQUID COATINGS.
		SARCO ROAD COMPOUND.	SARCO MASTIC.	SARCO ELASTIC ROOF COATING.	SARCO MINERAL RUBBER PIPE COATING.
		SARCO ASPHALT FILLER.	SARCO VARNISH GUM.		

DESCRIPTION—All SARCO products, with the exception of the liquid coatings, are shipped in a solid state, and reduced by heat to a liquid to facilitate their application.

Every SARCO product will analyze 99.5% pure asphaltic bitumen, and we unqualifiedly guarantee them to be absolutely uniform.

They are especially adapted for protecting any character of construction from damage by water. This protection will be permanent, as the material will undergo no change after it has been put in place, being absolutely non-absorbent, and unaffected by acids or alkalies.

SARCO Liquid Protective Coatings are used where conditions are not severe, and for protecting metal surfaces exposed to the weather.

FACILITIES—We are prepared to furnish any of the above listed products in any quantity desired.

Our manufacturing facilities are unlimited, and for that reason prompt shipments are always assured.

SARCO products shipped in a solid state are contained in a light sheet steel drum, the entire weight of the package being about 450 pounds, with a tare of 2%.

ADVANTAGES—SARCO products have given complete satisfaction wherever they have been employed, and when properly applied, their protective value is unquestioned.

It frequently occurs that an Engineer or Architect is confronted with a complex problem in waterproofing, necessitating expert advice for determining the best method to pursue to obtain the desired results. In instances of this kind, we are frequently called upon to furnish plans and specifications. This service is given without cost.

Some of the most difficult waterproofing construction that has ever been attempted has been referred to us, and in each instance SARCO materials and SARCO methods have proven a complete success.

We are willing at all times to co-operate with the Architect or Engineer, and to furnish any information regarding our products or methods that may be desired.

On account of the advanced and improved building methods, the **MASTIC FLOOR** has recently been receiving the attention it deserves. When the advantages to be obtained by the use of this floor are known, it is given preference over every other kind.

SARCO Mastic Floors, by reason of their unqualified success, have more than any other one thing contributed to the popularity of this style of floor. We have prepared a booklet fully describing SARCO Mastic Floors—how they are built, and other valuable information. A copy will be sent upon request.

ESTIMATES—Upon receiving the necessary information, we will be pleased to furnish estimates both for the cost and time necessary to complete the work on any class of construction where our materials can be used to an advantage. We make no charge for this service, and Architects and Engineers are requested to call upon us for any information they may desire.

REFERENCES—The extremely large number of places where SARCO products have been used successfully prohibits listing them here, but we will be pleased to furnish these references upon request, and in this manner it will be possible to name the places that will be in the immediate vicinity of the party making the inquiry.

CYRUS H. HOWELL, President

WALTER E. SCHMIDT, Secretary

EMIL G. SEIP, Treasurer

The **Illinois Improvement & Ballast Co.**

THE LARGEST DISTRIBUTORS OF

SLAG

IN THE UNITED STATES

The Best Fire-Proof Material on the Market

CHICAGO OFFICES

Commercial National Bank Building

Rooms 643 and 645

TELEPHONE CENTRAL 1584 AND 5551

WORKS

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JOLIET, ILLINOIS
CLABURN, ILLINOIS
GARY, INDIANA

SOUTH DEERING, ILLINOIS
NORTH CHICAGO, ILLINOIS

The American Asphaltum & Rubber Co.

MANUFACTURERS OF

HIGH GRADE ASPHALTS

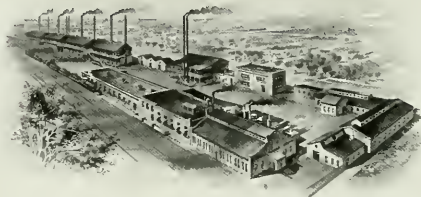
Owners of

GILSONITE MINES, Utah

Ninety-nine per cent pure. Estimated by U. S.
Geo. Dept. '96 to contain over 400,000 tons.

ASPHALTIC LIMESTONE MINES, Utah

Quantity Unlimited
Used for Mastic Floors, Roofs,
Pavements, etc.



General Offices:

600 to 614 Harvester Building,
CHICAGO, ILL.

Telephone Harrison 7956

Works and Laboratory:

Grand Crossing, Ill.

Cable Address: "Asphaltum" (Lieber's)

PRODUCTS

We are manufacturers of staple asphalt products. Among these are our "Pioneer" Mineral Rubber Pipe Coating, "Pioneer" Waterproofing Asphalt, "Pioneer" Filler Asphalt for brick and block pavements, "Pioneer" Mineral Rubber Roofing Cement, "Pioneer" Roof Coating, "Pioneer" Primer Paint, "Thebest" Insulation Paint, "Wasatch" Structural Paint, "Amarco" Roof Paint, "Wasatch" Mastic Floor, "Pariette" Ready Roofing, "Pioneer" Roofing Asphalt, Railroad Bridge Floor Coating, Reservoir Waterproofing Asphalt, Paving Cement, etc.

DESCRIPTION

The basis of each of these products is the highest grade Asphalt known—Utah Gilsonite, of which we own immense deposits, and which is 99.9 per cent pure bitumen; thus it is absolutely free from all impurities—it is unaffected by water or weather conditions, and insures a permanency that can not be excelled, and is not equaled by so-called substitutes.

RECORD

Our products are not new or untried. They have been on the market for 14 years, and have all been put through the crucial tests of practical use. In any true technical comparison of values, based upon quality of bitumen, they will readily **prove out**—easily demonstrate the superiority which has made them practically non-competitive.

USES

The range of utility to which our various materials are adapted is fairly indicated by the trade name under which each is known. Is it a question of the protection and preservation of bridges and structural work generally—pipe lines—the waterproofing of reservoirs, aqueducts, or concrete bridge abutments—brick or block paving—macadam road construction—asphalt pavements—floors or roofs for factories, shops, institutions or homes? Then the engineer, the architect, the contractor and the owner can apply to us with the assurance that the desired material will be supplied, and that it will give a most gratifying measure of satisfaction. We not only assert that our products are superior to most (if not all) others, but we can refer to a long list of leading engineers, architects and customers who will substantiate every claim.

FACILITIES

Our Gilsonite and Asphaltic Limestone Mines, located in Utah, contain over a million tons of raw materials, while with our modern plant, centrally located near Chicago, we have unsurpassed facilities for prompt shipments to all parts of the United States regardless of quantity.

CO-OPERATIVE SERVICE

All departments of our business are in charge of men specially educated and trained in their respective lines, and we are therefore in position to give reliable, expert opinion on all questions involving the employment of Asphalt. Estimates will be furnished upon receipt of plans and specifications, and not infrequently we can make suggestions, based on long experience, which will be of inestimable value.

PRICES

Every commodity—all service—is cheap or costly in proportion to its ability to **stand the test**. Claims have no market value. Pretension cannot long remain under cover. Nothing counts but **results**, and on this basis we are prepared to demonstrate that **our prices are always the lowest**.

CATALOGUES SAMPLES

Correspondence solicited. Full and reliable data and samples sent on request.

United States Crushed Stone Company

CHARLES A. KLOTZ, President

184 LA SALLE STREET, CHICAGO

QUARRIES:

McCook, Ill.
Racine, Wis.

Capacity, 10,000 Tons Daily

This Company has recently opened one of the largest limestone quarries in the west and has now completed the installation of an up-to-date crushing plant, consisting of Thomas A. Edison's GIANT CRUSHING ROLLS, the largest stone crusher in the world, and nine auxiliary crushers.

This Company, by reason of its immense capacity and unexcelled shipping facilities, is now in a position to accept orders for any quantity of Crushed Stone and to make prompt shipment to all points.

The MCCOOK quarries are located on the Indiana Harbor Belt Railway, Chicago Terminal Transfer Railroad, Chicago Junction Railway and Atchison, Topeka & Santa Fe Railway.

The RACINE quarries are located on the Chicago & Northwestern Railway.

Our product is a hard, white limestone suitable for all purposes and screened to any desired size.

PRICES furnished upon application.

Let us have your inquiries.

Raymond Concrete Pile Company

General Offices:

Branch Offices:

BALTIMORE
PHILADELPHIA

135 Adams Street, Chicago
140 Cedar Street, New York

Branch Offices:

PITTSBURGH
ST. LOUIS

The constantly increasing use of concrete piling is a substantial recognition of the claims made for it by its advocates. The one advantage over concrete piling that wood piling has possessed, namely, low initial cost, is rapidly disappearing, due to the growing scarcity of the available lumber supply caused by constant deforestation. The absolute permanence of concrete piling, its freedom from the dangers that threaten the integrity of wood piling—rot, over-driving, the attacks of boring animals, etc.—its low ultimate cost, the fact that its constituent materials may be obtained almost anywhere, are factors that in time will drive wood piling into the background so far as most cases where piling is necessary are concerned.

The growing favor, as indicated by its constantly enlarging scope and use, that Raymond concrete piling is finding in the eyes of architects and engineers is significant proof of the wisdom of the thought that animated its inventor and exploiters: that a system of concrete piling that would be practicable, that could be depended upon for durability and strength and whose cost would be much less than that of caissons, would have a wide field of usefulness.

Raymond concrete piles are made by driving a tapering sheet steel shell to refusal by means of a collapsible steel core, withdrawing the core and thereupon filling the shell with concrete. Before being filled the shell is subjected to careful inspection. After inspection, thoroughly mixed concrete, composed of one part good Portland cement, three parts sharp sand, and five parts crushed stone or gravel of suitable size, is poured in, being carefully tamped until the shell is filled.

Our wide experience in placing Raymond concrete piles under nearly every conceivable soil condition bears out our contention that for most foundation work, large, tapering piles are at once the best and most economical. Where piling is necessary the soil is usually poor. Often the best stratum is that lying on or near the surface. In most soils, large, tapering Raymond concrete piles, 18 or 20 inches in diameter at the top and 6 or 8 inches in diameter at the point are very much more effective than straight piles of greater length. This is particularly the case where a comparatively hard stratum is underlaid by softer material.

In a tapered pile the load is more uniformly distributed throughout the entire length of the pile. In a straight pile, however, the load is largely concentrated upon the limited area of the point. Thus, where a large tapering pile passes through the hard stratum lying near the surface into the softer underlying material, the bearing value of the upper stratum is fully developed through the wedge-like action of the pile. On the other hand, by employing a pile that is straight, or nearly so, the bearing value of the upper stratum is almost entirely lost.

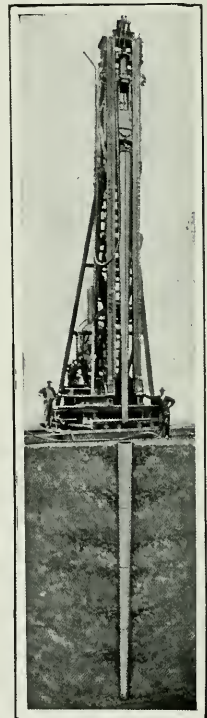
The marked advantage, in point of economy, of the tapered pile over other piles, whether of wood or concrete, is brought out in a striking manner by the following comparison of the head surfaces of different diameters:

	Head Surface.
One 20-inch Raymond pile.....	314.16 sq. in.
One 18-inch Raymond pile.....	254.47 sq. in.
One 16-inch pile.....	201.06 sq. in.
One 14-inch pile.....	153.93 sq. in.
One 12-inch pile.....	113.09 sq. in.
Three 12-inch piles.....	339.27 sq. in.
One 14-inch pile.....	153.93 sq. in.
Two 14-inch piles.....	307.86 sq. in.
One 16-inch pile.....	201.06 sq. in.
Three 16-inch piles.....	603.18 sq. in.
Two 20-inch piles.....	628.32 sq. in.

The Superiority of the RAYMOND SYSTEM of Concrete Piling over any other type of concrete piling is the result of its six basic factors:

1. A shell or form that remains permanently in the ground is used for every Raymond concrete pile. Perfection is furthermore assured in each pile by the ease with which the shell is inspected before filling it with concrete.
2. Raymond concrete piles, due to their large size and tapering shape, develop the greatest possible bearing value.
3. Raymond concrete piles can be easily reinforced.
4. Raymond concrete piles can be more rapidly placed than any other type of concrete piles.
5. Raymond concrete piles are placed without driving on the concrete, and there is consequently no possibility of fracture.
6. Driving the shell of every Raymond pile to a determined resistance before filling it with concrete gives the assurance of known bearing value coupled with thoroughly tested piles.

We design, make and place concrete piles and concrete sheet piles to meet any condition where piling is necessary. We also design and build difficult foundations, docks, piers, bulkheads, sea walls, retaining walls, and other types of reinforced concrete structures. On request, we will send a representative anywhere at any time, at our expense, to figure on prospective work.



Illustrating the method of making and placing Raymond Concrete Piles

The Barber Asphalt Paving Company

MANUFACTURERS OF

Genasco Roofing and Waterproofing Materials

Land Title Building, PHILADELPHIA
30 Church Street, NEW YORK



906-9 Addison Head Bldg., SAN FRANCISCO
1328 to 1348 Tribune Building, CHICAGO

PRODUCTS Trinidad Lake Asphalt Roofing Cement, Genasco Asphalt Saturated Felt, Genasco Asphalt Tile Cement, Vulcanite Special Mastic.

Genasco Ready Roofings, four types: Model, Smooth Surface, Stone Surface and White-stone. They are the standard ready roofings, and are guaranteed for five to ten years. Complete directions for laying with nails and Liquid Cement or Kant Leak Kleetz, as specified, are packed in the core of each roll.

Genasco Liquid Roof Coating for Felt Roofs;

Genasco Roof Paint for Tin and Metal Roofs;

Genasco Positive Seal Felt;

Genasco Positive Seal Fabric;

Genasco Positive Seal Solid and Liquid Asphalt Cements;

Genasco Positive Seal Paints.

All of the above products are made from Trinidad Lake Asphalt and other natural asphalts.

TRINIDAD LAKE ASPHALT ROOFING CEMENT—For the construction of built-up roofs use Trinidad Lake Asphalt Roofing Cement with either asphalt or coal-tar saturated felts.

A four-ply Trinidad Lake Asphalt roof is much more durable and less expensive than a five-ply roof made with coal-tar pitch, the slight excess cost of the asphalt being more than offset by the saving on felt and sheathing paper.

Trinidad Lake Asphalt was economical when it cost two or three times as much as coal-tar pitch; at its present low price there is no excuse for using inferior materials.

Send for Roof Specifications.

Genasco Positive Seal Felt and Fabric (Saturated Burlap) are especially adapted for rendering concrete or masonry impervious to water for the protection of all kinds of underground structural work. The felt and the burlap fabric are made of the highest grade materials obtainable, and are thoroughly saturated and coated with natural asphalt so that no particle of the fabric is exposed. These products have unusual tensile strength, and in connection with Genasco Positive Seal Cements will make the most effective waterproofing course possible to construct.

GENASCO POSITIVE SEAL SOLID CEMENTS—These cements are manufactured from natural asphalts, and are free from coal-tar or blown oil. They are especially adaptable for use with Genasco Positive Seal Felt and Fabric for all classes of underground waterproofing, but where there is no water pressure to be overcome they may be applied without the use of felt or fabric for the protection of metal, concrete or brick structures. Such surfaces, however, should first be painted with Genasco Positive Seal Paint. **Genasco Positive Seal Liquid Cement** may be used cold as a substitute for the Solid Cement, where there are no facilities for heating the latter.

GENASCO POSITIVE SEAL PAINT No. 1—This is the ideal damp-proofing paint, having valuable characteristics not possessed by any other paint. It will positively seal the pores of brick, stone or concrete against moisture, and may be used under any form of sand plaster, the rough plaster being laid directly upon the paint without lathing or furring.

GENASCO POSITIVE SEAL PAINT No. 2 is used as a priming coat for wood, masonry or steel, where Positive Seal Solid Cement is to be applied hot.

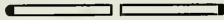
Our booklet entitled "Waterproofing by the Positive Seal Method" will be mailed on request. This booklet contains detailed descriptions and specifications of the above waterproofing and roofing materials, and will be found of particular interest to architects and engineers.

AYER & LORD TIE CO.

Manufacturers and Dealers in

Ties, Paving Blocks, Timbers, etc.

RAILWAY EXCHANGE BUILDING
CHICAGO, ILL.



PRODUCTS

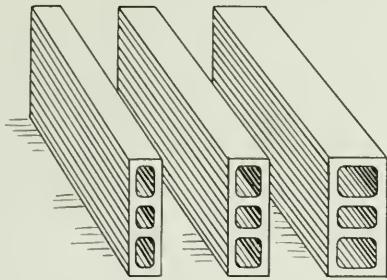
Railroad cross-ties, treated and untreated, piling, lumber, timbers of all kinds, railroad and commercial, and creosoted wood paving blocks.

DESCRIPTION

The Ayer & Lord Tie Co. handles ties from all classes of Southern woods, principally white oak in the untreated ties, and red oak and black oak, as well as beech, ash, elm, gum and pine, in the treated timbers.

FACILITIES

Treating plants at Carbondale, Ill.; Grenada, Miss., and Argenta, Ark., with a total of sixteen cylinders. The plants are equipped to treat with both chloride of zinc and creosote oil. At Grenada, Miss., we have a mill for the production of paving blocks with a capacity of 4,000 square yards of 4 inch blocks per day, and cylinder capacity in double that amount. We have storage capacity at our plants for 2,000,000 gallons of creosote oil, and storage at New Orleans for as much more. The company has 25 miles of track in its yards and operates its own fleet of 5 steamboats and 80 barges on Southern rivers.



MACKOLITE PARTITION TILE

PHONE MAIN 4142
AUTOMATIC 4142

D. W. BOYD, Pres. & Mgr.
GEO. S. ANGUS, Sec. & Treas.

The A. B. Fireproofing Co.

(Incorporated)

Manufacturers and Contractors of

MACKOLITE FIREPROOF PARTITION
TILE and PLASTER BOARDS

1402-1403 SCHILLER BUILDING

CHICAGO, ILL.

PRODUCTS	Manufacturers and Contractors of Mackolite Hollow Partition Tile, Furring Tile and Plaster Boards.
DESCRIPTION	Mackolite Tile is a composition of Gypsum which is a superior Fireproofing material.
SERVICE	We are prepared to furnish large quantities of material on short notice, as our stock on hand is always big on standard sizes.
FACILITIES	This company has a complete and modern plant with superior shipping facilities.
EQUIPMENT	Is up to date, and of the very best.
ADVANTAGES	The easy working and economical qualities, as well as its lightness in weight makes Mackolite Tile a very desirable and valuable partition material.
ESTIMATES	This company will gladly furnish prices for Mackolite Tile, delivered F. O. B. any railroad point, or on buildings requiring large quantities will furnish estimates on same erected in place.
GENERAL INFORMATION	During the past twenty years Mackolite Tile has been used for partitions in many of the largest and best buildings erected in Chicago and throughout the country.



TRADE-MARK

H. W. JOHNS-MANVILLE Co.

27-29 Michigan Avenue, CHICAGO

General Office, New York City



TRADE-MARK

ASBESTOS BUILDING MATERIALS	Transite Asbestos Wood, Vitribestos Fire-proofing, Vitribestos Smokestack Lining, Asbestos and Building Papers, Brickline and Chimney Cement, Asbestos and Magnesia Pipe and Boiler Covering.
ROOFING MATERIALS	J-M Asbestos Roofing, J-M Regal Roofing, Transite Asbestos Fire-proof Shingles, J-M Roof Coatings and Cements—Asbestoside (wall siding), J-M Asphalt Saturated Asbestos Felts for damp and water-proofing work.
INSULATING AND COLD-STORAGE MATERIALS	Hair Felt, Keystone Hair Insulator, Mineral Wool. We also manufacture every description of Cork Sheets and Cork products for Cold-storage work. Contracts made for material only or applied complete.
ELECTRICAL SUPPLIES	"Noark" Fuse devices, Tungsten and Carbon Filament Lamps, Linolite Systems of lighting. Overhead line materials for Trolley and Feeder construction. Molded and sheet insulating specialties. Ebony Asbestos Wood, Vulcabeston, Molded Mica, Electrabestos, Friction and Rubber Tapes, Electrical Specialties and Supplies.
OUR FACILITIES	Being the largest manufacturers in the world of Asbestos and Magnesia products we are able to supply any special material that may be required. We carry at each of our Branch Houses a complete stock of our products, thus enabling us to make prompt, economical deliveries to all points.
ESTIMATES	We maintain at each Branch a competent Engineering Corps and a force of skilled workmen. Estimates for applications of our materials promptly submitted.

Anhydrous Pressed Stone Company

405 Chamber of Commerce Building, CHICAGO

MANUFACTURERS OF

HOLLOW CONCRETE BLOCKS

Sills, Lintels and Coping

and the well known Waterproofings

ANHYDRA WATERPROOFING COMPOUND

ANHYDRA WATERPROOFED CEMENT

Office Phone, Main 5278

Works Phone, Morton Park 16

T. W. PHINNEY, President

JULIAN J. PLEAS, Vice-President

T. P. HENDERSON, Sec'y. and Treas.

ESTABLISHED 1859

CHICAGO UNION LIME WORKS CO.

PRODUCERS AND SHIPPERS OF

LIME AND CRUSHED STONE

Quarries at

19th AND LINCOLN STREETS
CHICAGO

McCOOK, ILLINOIS

312 Chamber of Commerce Building

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MAIN 3480

AUTOMATIC 6161

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INTERIOR MARBLE WORK IN ALL VARIETIES
OF FOREIGN and DOMESTIC MARBLES

Contractors for the marble work in:

New Cook County Court House.
First National Bank Building, Chicago.
Sears, Roebuck & Co.'s Administration Building.
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Cook County Tuberculosis Hospital.
McCormick Residence, Lake Forest.

First National Bank of Detroit.
Louisville Public Library Building.
Joliet National Bank.
Indianapolis Board of Trade Building.
First National Bank of Chattanooga.
More than 20 Chicago Schools.

Office and Mill: 53rd and Wallace Sts., CHICAGO

Phone: Yards 526

Woodbury Granite Company

HARDWICK, VERMONT

GEORGE H. BICKFORD, General Manager

Quarries:

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BETHEL, VT.

Branch Offices:

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Cutting Plants:

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Water Power Stations: MACKVILLE, VT. and GAYSVILLE, VT.



CHICAGO CITY HALL AND COOK COUNTY COURT HOUSE
HOLABIRD & ROCHE, Architects



LA SALLE STREET STATION
FROST & GRANGER, Architects

PRODUCTS

Woodbury Gray Granite, a blue gray, hard, non-absorptive stone, of enduring quality, used for high grade building and construction work.

Woodbury Bashaw Granite, a dark blue gray, fine-grained stone, used for monuments, public fountains and memorials.

Hardwick White Granite, the whitest granite known, and the choicest building stone quarried in America.

SERVICE

We have furnished Woodbury Gray for the Chicago City Hall and Cook County Court House, La Salle Street Station, Pennsylvania, Kentucky and Iowa State Capitols; Hardwick White Granite for the Wisconsin State Capitol, and new Pro-Cathedral at Minneapolis; Bashaw Granite for monuments from Maine to California.

EQUIPMENT AND FACILITIES

At our Woodbury Quarry—Twelve modern derricks, railroad sidings, steam and compressed air, cableways for grout removal, power drills, and every appliance for speed and economy.

At our Bethel Quarry—Five modern derricks, railroad sidings, electric power, air drills, cableways for grout, level quarry beds and an open working face.

At our Hardwick Plant—Five cutting shops, accommodating 400 cutters; electric power, 3 electric cranes, 2 dago engines, 3 derricks with electric hoists; 4 gang saws, 2 McDonalds, 7 lathes, 8 polishers, compressed air hand tools, machine shop, and a trained organization.

At our Bethel Plant—Four cutting shops, accommodating 350 cutters; electric power, 3 electric cranes, dago engine, 2 McDonalds, 4 lathes, compressed air hand tools, machine shop, and 600 H. P. steam auxiliary plant.

At Mackville, Vt.—Water power station, supplying 450 K. W.

At Gaysville, Vt.—Water power station, supplying 300 K. W.

GENERAL INFORMATION

Capital, \$1,000,000. Productive capacity, 2,500 cubic feet of finished work per eight hour day. This means that contractors dealing with us can avoid penalties for granite delays. Unsurpassed equipment. Rapid delivery. Rough or finished granite in any amounts. Estimates furnished for granite work anywhere, delivered and set in place, if desired.

Kettle River Quarries Company

GENERAL OFFICES MINNEAPOLIS

BRANCHES

CHICAGO

1033 1st National Bank Building

ST. LOUIS

508 512 Pierce Building

954 SECURITY BANK BUILDING



QUARRIES

Sandstone, Minn.

CREOSOTING WORKS

Madison, Ill., and Sandstone, Minn.

WE MANUFACTURE

CREOSOTED WOOD PAVING BLOCKS and CREOSOTED CROSS ARMS.

We also have unexcelled facilities for TREATING RAILROAD TIES and BRIDGE TIMBERS. Our plants are complete and modern in every respect. We can turn out 6,000 square yards of blocks a day at one plant. We produce BUILDING STONE, CURBING and SANDSTONE PAVING BLOCKS.

Upon application we shall be glad to send literature or furnish estimates on any of the above.

CHICAGO TERRA COTTA Co.

HIGH GRADE ARCHITECTURAL TERRA COTTA AND BRICK



1208 CHAMBER OF COMMERCE BLDG.

CHICAGO

T. E. RYAN, President

J. H. RYAN, Secretary

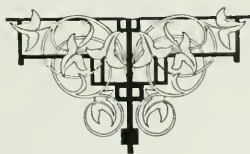
Organized 1899 — Capital Stock, \$75,000

Citizens' Construction Co.

Successors to

Gaffney & Long Construction Co.

805 Chamber of Commerce Building



Contractors for Street Improvements

Pavements and Underground

TELEPHONE MAIN 1308

M. H. McGovern Company

General Contractors *and*
Construction Engineers

Chamber of Commerce Chicago

Plant and Yard: 1084 SOUTH PAULINA STREET

TELEPHONE CANAL 2466

U. S. WOOD BLOCKS

"The Silent Pavement"

A PERFECT PAVEMENT

U. S. Creo-resinate Wood Block Pavement marks a new era in American street paving.

It is **silent**; it is **clean**, **durable**, **easily taken up and replaced**. It is **smooth**, but not as slippery as asphalt. It is **water-proof**, **rot-proof**, **oil-proof**, wears indefinitely under heavy drayage and is not injured by street car vibration.

Each Creo-resinate Wood Block is saturated under heat and pressure with creosote and resin—the creosote giving preservation, the heavier resin permanently preventing evaporation of the creosote.

The pavement takes the wear on the end-fibres of the close-set blocks, which are set on a concrete foundation. Water cannot penetrate the pavement, which thus is frost-proof. The end fibres of the block do not splinter, split or wear, and the contour of the pavement is preserved.

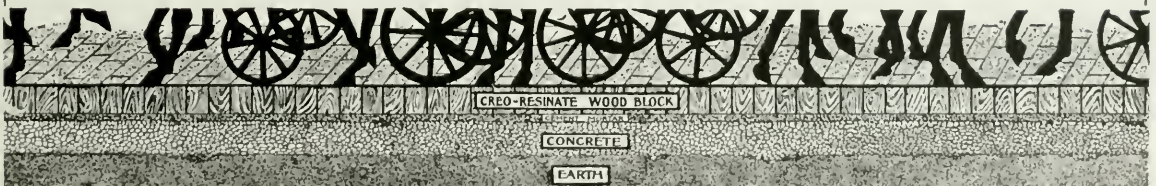
The life of a U. S. Creo-resinate Pavement, without repairs, is greater than granite. The necessary removals and replacements for repairs to underground pipes, etc., are indistinguishable after relaying. The upkeep cost is nothing. The U. S. Creo-resinate Wood Pavement reduces the cost of street cleaning to a minimum.

The Parker Washington Co.

Chicago St. Louis Kansas City Oklahoma and Texas

GENERAL CONTRACTORS

Pavements, Tunnels, Sewers, Water Pipes, Reinforced Concrete, etc.



AMERICAN CLAY COMPANY

TERRE HAUTE, IND.

Manufacturers of Clay Products

Including

HOLLOW BUILDING BLOCKS

BUILDING TILE—PARTITION TILE—BOOK TILE

RADIAL BLOCKS (for Elevator and Tank Construction)

DRAIN TILE—FLUE LINING

Daily Capacity, 120 Tons.

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Producers Supply Company

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THE ALONZO CURTIS BRICK CO., Inc.

Manufacturers of

HARD BUILDING BRICK

Yards, Grant Park, Ill. Phone Long Distance 69

Chicago Office, 1115 Chamber of Commerce Building
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This Company is one of the largest and best equipped Common Brick Plants in the country. It has a daily capacity of 300,000 common brick. The business was established in 1882. The plant employs about 130 men. The plant is located in Grant Park, Ill., on the C. & E. I. Ry.

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Manufacturers of Chicago Common and Sewer Brick.

Annual Capacity, 750,000,000.

Yards located on all principal railroads entering Chicago.

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Pressed, Impervious
Paving, Glazed
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FACTORIES OF
THE PHILIP CAREY MANUFACTURING COMPANY

ESTABLISHED 1873

LOCKLAND, OHIO

INCORPORATED 1888

The largest manufacturers of a uniform grade and quality of roofing in the United States. This company has been manufacturing what is known as Carey's Flexible Cement Roofing or "The Carey Roof Standard" for twenty-five years, and which is now in general use throughout all parts of the United States, Canada and Mexico, and proved one of the most satisfactory and substantial roofing materials so far produced.

"The Carey Roof Standard" is adapted for all classes of buildings—flat or steep surfaces—particularly such buildings where the roof is subjected to severe exposure and destructive influences.

Over forty-six branches and distributing points located at convenient points, fully equipped with competent workmen and stock, places this company in position to handle any size contracts with the assurance of prompt attention and best service.

The large factories, located at Lockland, Ohio, cover a ground surface of seventy-five acres and are devoted principally to the manufacture of The Carey Roof Standard and Carey's Roofing Paints.

Estimates, samples and full information may be secured by application to any Carey Branch or Dealer.

2355-7-9 LA SALLE STREET,
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Western Roofing and Supply Company
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THE SUN NEVER SETS



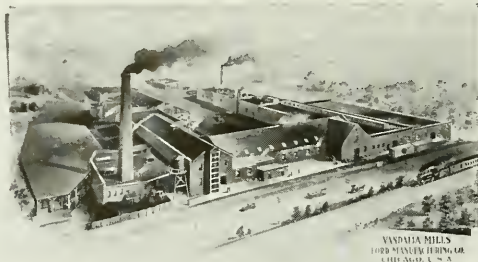
VULCANITE ON VULCANITE ROOFING

without giving the house owner who uses it a feeling of great satisfaction. WHY? Because he knows that "Vulcanite" Roofing is the most perfect, economical and wearing roof protection made

THAT'S WHY **VULCANITE ROOFING** IS UNIVERSALLY USED

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Leading ARCHITECTS and BUILDERS specify FORD'S Prepared, Ready-to-lay ROOFINGS, because they are

"Special Roofs"

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General Sales Office and Warehouse 2339-41 La Salle Street
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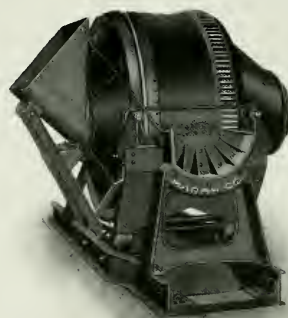
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Concrete Mixers

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Mineral Wool for insulating and deadening. Asbestos and Roofing Materials, Hair Felt, etc.

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Contractor for complete installation of HEATING PLANTS in Public and Private
Buildings and Industrial Plants wherever located, and also POWER
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Exposed walls protected on
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Compound No. 10

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National No. 9 Valve
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**AUTOMATIC AIR VALVES
PRESSURE AND VACUUM GAUGES**

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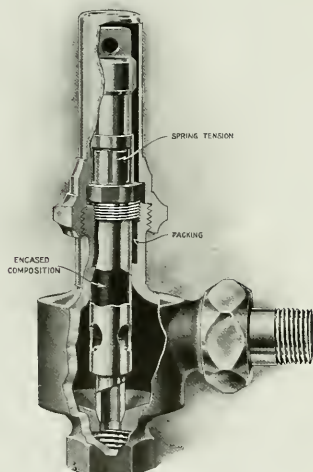
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(Made in three sizes)

$\frac{1}{2}$ in. x $\frac{1}{2}$ in.	-	-	-	-	-	-	Capacity 250 feet
$\frac{1}{2}$ in. x $\frac{3}{4}$ in.	-	-	-	-	-	-	„ 500 feet
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No royalty to be paid for use of our trap

For use in connection with vacuum systems, on radiator heater coils, dry kilns, also on drips from risers, and at the end of long runs of heating mains.



National Thermostatic Trap

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All Departments



Established
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Washington Boulevard and Morgan Street

We Manufacture

High Tension Switch Boards (ask the Oak Park Power Co., Flint, Mich.); Glass Switch Boards for High Schools; Large Direct Current Switch Boards (ask Siegel, Cooper & Co., Chicago); Panel Boards S. Steel Cut-out Cabinets (ask the Corn Products Co., Argo, Ill.).

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Wiring Large Office Buildings for Electrical Conventions; Complicated Sub-Station Work.

Repair Department

For Rewinding Motors, Dynamos, Repairing Electrical Machinery of all descriptions.

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HEATING VENTILATING APPARATUS
COMPLETE POWER PLANTS
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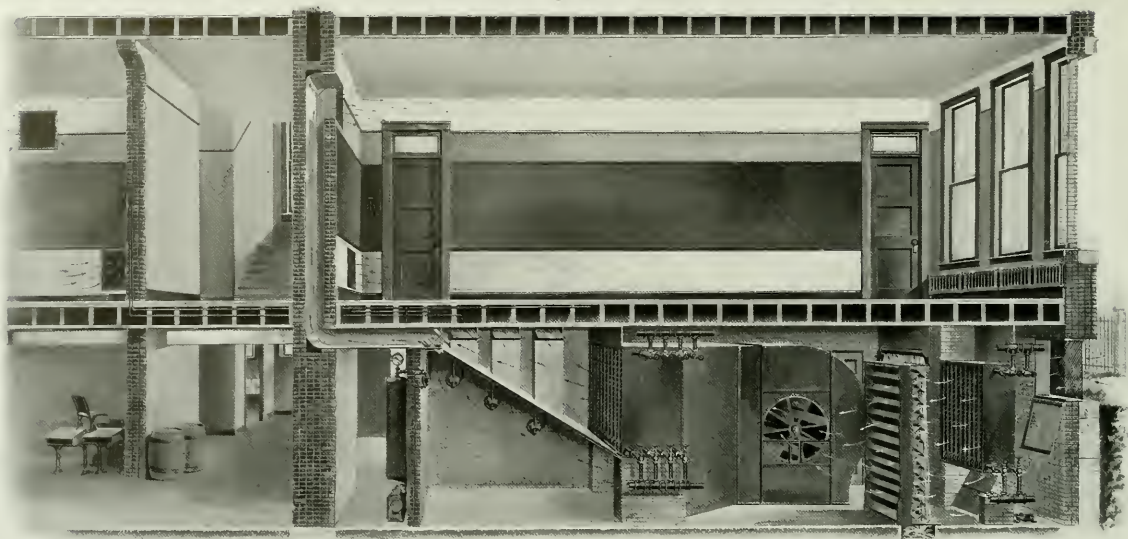
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Selective Call For Telephone Train Dispatching

CHICAGO, ILL.



Showing an adjustment of VENTO pattern of AMERICAN Radiators for warming and ventilating a school building; the heating stack is shown at the right, and next (to the left) is an air washer to insure a pure atmospheric circulation.
Prominent Chicago buildings use these heaters.

Heating Progress in Chicago

When the first steel-frame structure in the world was planned in Chicago, the architect knew that it could be well warmed when built. So the sky-scraper, born in Chicago, became a fixed fact in architecture. But these towers of original Chicago enterprise could never have risen much above a four-story, without the skilled heating engineer, steamfitter, and the AMERICAN Radiator to make them comfortable. Thus the sectional Steam or Water Radiator (made by a Chicago concern) has contributed much to advance the comfortable phase of the "Half Century of Chicago Building."

Nearly every prominent building in this city is warmed by AMERICAN Radiators. In fact, the major part of all the radiator heated Chicago buildings rely on AMERICAN heating surfaces for their comfort. As this fifty years of Chicago building progress has been the result of natural best selections in all materials, these facts testify to the approved, time-tested excellence of AMERICAN Radiators. Thousands of other structures which dot the large cities and towns of this country and Europe, Asia, Africa and Australia, rely on these popular heating surfaces for artificial comfort.

The VENTO Heater above illustrated, which is a special form of AMERICAN Radiators, is used for heating and ventilating purposes in the Railroad Exchange; University Club; Seventh Regiment Armory; Hart, Schaffner and Marx building; John M. Smyth Building; Commonwealth-Edison Building and American Music Hall. This Heater will also be extensively used in the new Chicago and Northwestern Railway Terminal, Blackstone Hotel, and the Peoples' Gas Light Building, now under construction.

AMERICAN RADIATOR COMPANY

SALES ROOMS, 282-286 MICHIGAN AVENUE, CHICAGO

All are invited to call and see our samples of artistic AMERICAN Radiators and IDEAL Steam and Water Boilers, for all sizes of buildings from a 3-room cottage up to the highest sky tower. Sales Rooms and Warehouses in all large cities of America and Europe.

1878

James B. Clow & Sons

1910

Manufacturers of

CAST IRON PIPE, FITTINGS, VALVES, WATERWORKS

:: :: SUPPLIES, RADIATORS, HEATERS, :: ::

STEAM AND GAS GOODS, PLUMBING GOODS, MARBLE



Coshocton Ohio Plant, James B. Clow & Sons

Nothing astonishes men so much as common sense and plain dealing. These were the words of Ralph Waldo Emerson, and they stand as strong today as they did in his time.

The growth of James B. Clow & Sons from 1878 to the present time has been in accordance with common sense and plain dealing methods. Step by step the Clow Company has climbed the ladder of success, strengthening its position at every stage with the good will of its customers, together with the best equipment of men and machinery that this age affords.

Several times the company has been compelled from lack of space to move into larger quarters until now it is located in a modern seven-story fire-proof building, bounded by Harrison and Franklin Streets, Lomax Court and the Chicago River, with branch stores on the west and northwest sides of the city.

The company's shipping facilities are unexcelled: via rail right from the building, Illinois Tunnel, motor truck or Chicago water.

On account of the increased business the company was compelled to erect another plant to relieve the congestion at the Works, Newcomerstown, Ohio. A site at Coshocton, Ohio, was selected, comprising 75 acres of land. The new plant is now adding to the vast tonnage of the company.

The Clow Company maintains branch sales offices at New York, Washington, D. C., Pittsburg, Atlanta, Milwaukee, Minneapolis, St. Louis, Kansas City, San Francisco, Seattle and Havana, Cuba.

The officers of the company are:
 President—WILLIAM E. CLOW.
 Vice-President—CHARLES R. CLOW.
 Second Vice-President—HENRY B. CLOW.
 Secretary—JAMES C. CLOW.
 Treasurer—J. M. JOHNSON.
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Clow Building, Chicago, with unexcelled shipping facilities

Troy Laundry Machinery Co.

(LIMITED)

La Salle and Twenty-Third Streets
Chicago, Illinois

BRANCH HOUSES:

New York City San Francisco Seattle London Paris Amsterdam Berlin Augsburg



PRODUCTS

We manufacture a complete line of laundry machinery, ranging from the smallest appliance to the machine whose capacity exceeds the most trying or unusual demands.

DESCRIPTION

This includes Washers of wood or metal, Extractors, Wringers, Disinfecting and Sterilizing Machines, Tumblers, Starchers, Dryrooms and their Appliances, Dampeners, Ironers of all kinds, and also a full line of appliances for the special use of Dyers and Dry Cleaners.

SERVICE

We can fill orders promptly, anywhere in the United States and Canada and foreign countries, alike for a single machine or a complete plant, and furnish skilled construction engineers for its installation.

FACILITIES

Our factory with its $8\frac{1}{2}$ acres of floor space, is the largest in the world devoted exclusively to the manufacture of cleansing machinery, and a model in its equipment, organization and administration.

EQUIPMENT

Our mechanical equipment is the best obtainable; our material is carefully selected and rigorously inspected; our employees represent the highest type of skilled labor; the supervision is constant and along the most approved lines.

ADVANTAGES

Our location gives the opportunities of choice and saving possible near such a base of supplies; our shipping facilities in this railroad center enable quick deliveries to all sections.

ESTIMATES

Estimates on single or several machines or entire plants, covering, when desired, the cost of installation, are cheerfully furnished. Our catalogue will be sent on application, plans made by our drafting department and any information sought gladly given.

This Company was founded thirty years ago in Troy by leading practical launders of that city to meet their demands for improved equipment. It has had a surprising and consistent growth, especially since its location in its present home in 1906.

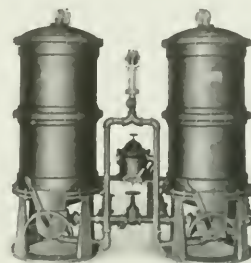
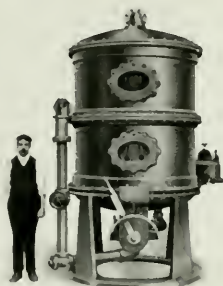
LOOMIS FILTERS

for the

Filtration and Purification of Water
for all purposes

Bright Sparkling Water Furnished Free from
Color, the Germs of Disease, and other
Deleterious Matter

Loomis Filters were first placed on the market in the year 1880



They had the first loose sand filter beds, originating what is now known as the American or Rapid System of Filtration. They have the only method by which every particle of the filtering material is thoroughly scoured and easily kept clean. They filter all the Water for Residences, Hospitals, Hotels, Apartments, Office Buildings, Manufacturing Establishments, City and Town Water Works.

They are specified by the leading Architects, Sanitary and Mechanical Engineers, and from an Expert's point of view—"are in a class by themselves."

White House, Washington, D. C., nearly 30 years of continuous service. Many other U. S. Government Buildings. U. S. Naval Academy, Annapolis, Md.; Johns Hopkins Hospital, Baltimore; Mount Sinai Hospital, New York City.

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The "Big Four" Office Buildings, New York City: Metropolitan Life, City Investing, Hudson Terminal and Singer.

Thousands of Loomis Filters in the finest Residences, Hotels, Apartment Houses, Office Buildings, Factories, etc., etc., in all the leading Cities.

A Few Users of the Loomis-Manning Filters

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St. Rita's College.
New Sherman House.
Northwestern Terminal.
The Hub Clothing House.
People's Gas Light & Coke Co., Office Building.
Mrs. C. B. Borland.
Mrs. H. B. Borland.
Mr. David B. Jones.
Northwestern University and Evanston Hospital, Evanston.
Mr. James A. Fatten, Evanston.
William A. Dyche, Evanston.
D. H. Burnham, Evanston.
Y. M. C. A., Ravenswood.

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Mr. Harry Payne Whitney.
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Mr. Suyvesant Fish.
Hon. Seth Low.
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Mrs. E. H. Harriman.
Mr. George Vanderbilt.
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Mr. Jacob H. Schiff.
Mr. Isadore Strauss.
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Mr. Charles F. Murphy.
Mr. Francis Lynde Stetson.
Delmonico's, Fifth Avenue.
Apthorp Apartments.

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Episcopal Hospital.
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Land Title & Trust Co.
Broad Street Station, Pennsylvania R. R.

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General John Gill.
Major Eric Bergland.
Mrs. William Keyser.
Mr. Alexander Brown.
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Dr. Henry Barton Jacobs.
Johns Hopkins Hospital.
American Tobacco Co.
New Court House.
Calvert Building.
Belvedere Hotel.
U. S. Court House and Post Office.

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"White House."
Justice Harlan.
British Embassy.
Hon. Wayne MacVeagh.
Mr. C. C. Glover.
Mr. George Westinghouse.
Mrs. Levi Z. Lott.
Evening Star Building.
Treasury Department.
New Post Office.
New Willard Hotel.

Loomis-Manning Filter Distributing Co.

Main Office: 828 Land Title Building
PHILADELPHIA, PA.

Chicago Office: 712 Marquette Building

BOSTON

BUFFALO

NEW YORK

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The Hahl Automatic Clock Co.

Sole Manufacturers of

The "Hahl" Pneumatic Clock System

2644-2648 NORTH MAPLEWOOD AVENUE
CHICAGO



103 Park Avenue
NEW YORK, N. Y.

111-113 New Montgomery Street
SAN FRANCISCO, CAL.

PRODUCTS

Clock Systems (Pneumatic), including Master Clock, Secondary Clocks and Program Clocks; Self-Winding Electric Clocks, Street and Tower Clocks built and connected with system.

THE SYSTEM

Master clock is operated by gravity. Time Train has self compensating pendulum, beating seconds, propelled by spring, automatically wound every minute. Air impulse and release of air emanating from the pneumatic device within the clock controls and operates the Secondary clocks without the aid of any auxiliary apparatus whatsoever. The air within the tubing is brought under slight pressure (1 inch water gauge) during one minute and is released by a valve in the Master clock, remaining open the next minute, thereby allowing the air to regain its normal atmospheric pressure.

AIR CONDUITS

One-quarter inch wrought-iron pipe for main, $\frac{1}{8}$ inch for branches. No return pipe. Start with two mains from location of Master clock in systems over 12 clocks each main feeding about one-half of the clocks. Not over five clocks to be fed by $\frac{1}{8}$ inch branch.

SECONDARY CLOCKS

The construction of these movements is extremely simple. The impulse of air furnished by the Master clock moves the hands exactly one minute at a time. No possibility of moving them either more or less. The hands are perfectly balanced. Motion is elastic, without jerking, and noiseless. The clocks are not disturbed by vibration, jarring or dust. Once connected, they are run, regulated and set from the Master clock, and require no attention whatsoever.

PROGRAM CLOCKS

Master Clock Program Apparatus—Program cylinder located within Master clock, case is built up of sections of one program each. New sections may be added as required. Lugs upon face of cylinder make contracts for signals of required duration at one minute intervals. Signals eliminated during hours and days not requiring signals.

Switchboard arranged for shifting bells to any of the programs, without affecting bell wiring or requiring the assistance of an expert.

CASES

Illustrations of our standard cases will be mailed on request. We build cases and dials to order.

ADVANTAGES

Motive powers employed being free atmosphere and gravity, the highest degree of reliability is attained. Under our system the cost of operation as well as wire and battery troubles are eliminated.

REFERENCES

Our system has been adopted by:

Marshall Field & Co., Chicago, Ill.
Cook County Court House, Chicago, Ill.
State Capitol, Madison, Wis.
U. S. Post Office, Atlanta, Ga.
First National Bank, Pittsburg, Pa.
School Boards of Chicago, Ill.; Kansas City, Mo.; St. Louis, Mo., and many others.

State Normal School, Milwaukee, Wis.
High School, Covina, Calif.
High School, Richmond, Ind.
High School, Beatrice, Nebr.
County Court House, San Jose, Calif.
Peoples Gas Bldg., Chicago, Ill.

The Decorators Supply Co.

Archer Avenue and Leo Street
Chicago, Ill.



Manufacturers of

Interior and Exterior Ornaments of Every Description

— in —

Cement	Composition	Plaster and Wood	
Columns	Capitals	Brackets	Cornices
Friezes	Mouldings	Panels	Wood Grilles
Composition Ornaments for Woodwork			

OUR SPECIALTY IS PROMPT DELIVERY

We Carry a Large Amount of Stock Goods



We Issue 4 Catalogs—One Each of
ORNAMENTAL PLASTER CASTS
COMPOSITION ORNAMENTS
CAPITALS AND BRACKETS
WOOD GRILLES



ESTABLISHED 1840

INCORPORATED 1909

GEO. B. CARPENTER & CO.

Mill, Railroad, Contractors' and Marine Supplies

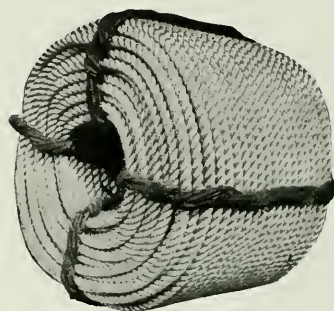
200-202-204-206-208 SOUTH WATER STREET

CHICAGO



River Front of General Offices and Store

Old Colony
Transmission
and
Hoisting Rope



PRODUCTS

Manufacturers and Mill Agents of: Cordage, Twines, Cotton Duck, Awning Stripes, Hose, Belting, Packing and Rubber Goods, Tackle Blocks, Derricks, Chain Hoists, Wire Rope, Contractors' Equipment, Marine Hardware, Yacht and Motor Boat Supplies, Tents, Flags, Awnings, and Camp Outfits.

SERVICE AND FACILITIES

This company carries the largest and most complete stock of Supplies to be found in Chicago and is prepared to make prompt shipments both from Chicago and from the mills it represents.

EQUIPMENT

Our South Water Street store is devoted to offices and samples of all our varied lines of goods. Our warehouses are located at Indiana and Orleans Streets, and our Cotton Goods factory and Sail Loft at Illinois and Wells Streets.

ESTIMATES

This company publishes a 650-page general catalog of its entire line; also supplemental catalogs in the several Departments, viz.: Cordage and Twines—Cotton Duck—Marine Hardware—Tents, Flags, Awnings—Hose, Belting, Packing, etc.—Camp Outfits, etc.

GENERAL INFORMATION

We have conducted this business continuously for seventy years, and offer our customers a service and experience which is unsurpassed in the trade.

Factories:

NEW YORK

CHICAGO

CLEVELAND

TORONTO

BENJAMIN MOORE & Co.

MANUFACTURERS OF

PAINTS ■ COLORS ■ VARNISHES MURESCO

401-409 NORTH GREEN STREET, CHICAGO, ILL.

PRODUCTS



MURESCO for over twenty years has been the leading wall finish used in this country. It is today in greater demand and more highly esteemed by the trade than any other material of the kind in use, its many points of superiority over Kalsomine and other wall finishes being acknowledged by all practical decorators.

DESCRIPTION

MURESCO comes in dry powder form put up in 5 pound packages, 100 pound drums, half barrels and barrels, ready for use when mixed with boiling water. It is made in white, sixteen tints and sixteen colors, comprising all of the most popular shades, and these may be intermixed if desired to form any special shade or tone required.

It is very easy to apply, covers perfectly with one coat and dries out without brush marks or imperfections, producing a beautiful, soft, velvety effect that is restful and pleasing to the eye, and far more artistic, sanitary and economical than wall paper or other decorating material.

ADVANTAGES

MURESCO can be applied to any kind of plaster, or to wood, brick, cement, canvas or paper. It will not rub off or peel, even where successive coats are applied, but when desired can be entirely removed with sponge and water, as it contains no lime, cement or other ingredients that become insoluble with age. Muresco is also the best fire retardent known, a feature rendering it of additional value for application to interior surfaces. Five pounds mixed according to directions will produce a gallon of material that will cover under average conditions five hundred square feet of surface.

INFORMATION

We will be pleased to furnish free upon request, Muresco sample cards, sample books, room combinations, and full information pertaining to Muresco or other goods of our manufacture.

The following prominent Chicago buildings finished with **MURESCO** are a few among thousands we can refer to in every city of the country:

Majestic Theatre Bldg., Fine Arts Bldg., Chicago Board of Trade Bldg., Medinah Temple Bldg., Rock Island Station, Chicago Telephone Bldg., C. & N. W. Ry. Office Bldg., Congress Hotel, Palmer House, Chicago Public Schools, La Salle Hotel, County Building.

Standard Varnish Works



2620-2640 ARMOUR AVENUE

The Standard Varnish Works was established in Chicago about 30 years ago by Mr. Oscar Rosenberg, now Vice-President of the Company; since that time it has grown rapidly like the wonderful city of which it is a part.

We manufacture all kinds of varnishes, stains, japans, fillers, lacquers, shellacs and dryers. There are many kinds of varnishes—for pianos, carriages, automobiles, boats, agricultural implements, furniture and house finishing. Stains are made for finishing all kinds of woods, lacquers for brass work, japans for iron and metal work.

We are prepared to furnish varnishes of all kinds and descriptions on short notice owing to our excellent manufacturing and shipping facilities. Our

large tank capacity permits us to carry a tremendous stock of all classes of goods, well aged and settled.

Our plant is complete and modern in every particular and though the capacity is large, we have outgrown it and have spread into adjacent buildings. We have recently acquired a large tract of land adjoining the present factory, which will be improved with a new and spacious building.

Among the best known brands are our Elastica finishes which were the pioneer proprietary varnishes introduced to the American public and at once became popular owing to the extremely high quality. They are intended for finest and exclusive work in residences, hotels, libraries, office buildings, public institutions and edifices, and other structures where quality is a consideration.

STANDARD VARNISH WORKS

New York

Chicago

London

Berlin

Brussels

INTERNATIONAL VARNISH CO., Limited, Toronto

Branches

ALBANY
BALTIMORE
BOSTON

Branches

LOUISVILLE
OMAHA
PITTSBURGH

Heath & Milligan Mfg. Co.

Paint and Color Makers

Manufacturing Plant and General Offices

CHICAGO, U. S. A.

PRODUCTS.	Manufacturers of Paints and Dry Colors.
DESCRIPTION.	Paints for railways, bridges, structural steel, stone, wood, plaster and all general exterior and interior painting purposes.
SERVICE.	<p>We carry at all times a large, complete stock of regular paint products. All orders for standard goods are shipped the day received.</p> <p>We are prepared to give prompt, efficient service to the matching of samples or making paints for special purposes, having a laboratory and corps of experts detailed on this work.</p>
FACILITIES.	Our plant is the most complete, modern, scientific, technological paint factory in the world. Completed in 1909. Steel and reinforced concrete construction.
EQUIPMENT.	Electric equipment throughout. All machines operated by individual motors. Automatic loading and unloading devices and all modern labor saving machinery.
ADVANTAGES.	By careful chemical and physical examination of all raw materials, we at all times maintain a uniform high standard of quality. With our equipment we can prepare with great facility any volume of business ranging from a half pint to car loads. The capacity of our liquid paint department is a car load every two hours and the output of our color, paste paint and specialties departments is proportionately large.
ESTIMATES.	We are prepared to figure with contractors, architects, engineers or large corporations on their specifications, for all classes of work, regardless of the amount of material involved. We furnish samples on request.

WM. T. MORGAN, Vice-President and Manager

ALBERT J. DENISTON, Vice-Pres. and Ass't Mgr.

Raymond Lead Company

Lexington Street and Washtenaw Avenue, CHICAGO

The Most Complete and Largest Lead Plant in the United States

(AND THAT MEANS THE WORLD)

ALL OUR MACHINERY ELECTRIC DRIVEN

Our new enlarged and up-to-date facilities enable us to produce the most perfect material. When ordering through your jobber specify Raymond Lead Company's Products and SEE THAT YOU GET THEM



OUR NEW PLANT AND GENERAL OFFICES

MANUFACTURERS:

Lead Pipe, Sheet Lead, Shot, Lead Traps, Bends, Ferrules, Collapsible Tubes, etc. Block Tin Pipe, Came Lead, Lead Sash Weights, Solder, Babbit and Mixed Metals, Pig Lead, Pig Tin, Antimony, Phosphor Tin.

ALL ORDERS EXECUTED SAME DAY AS RECEIVED.

GET OUR PRICES

Downtown Depot for City Trade, 34 N. CLINTON STREET

FLOORENE FOR FLOORS

Soap, Scrubbing Brushes, Cleaning Compounds and Scrubbing may be entirely dispensed with, if you use Floorene on your floors

SEND FOR OUR BOOK

Beautiful Floors Simplified

FREE FOR THE ASKING

Explains conclusively and successfully The Floor Finish Problem



DURENE FOR WOODWORK

Durene, as its name implies, is the most Durable, Lasting, Washable and Brilliant Wood Finish on the market.

Quality uppermost, Excellent flowing properties, full body and wear-proof, can be rubbed and polished

AMERICAN VARNISH CO.

VARNISH SPECIALISTS

1138 to 1140 NORTH BRANCH ST.
Telephone North 361



CHICAGO, U. S. A.



Chicago Flexible Shaft Co.

LA SALLE AVE. AND ONTARIO STS.

MAKERS OF

STEWART GAS AND OIL BLAST FURNACES

For the heat treatment of metals; flexible shafts and flexible shaft machinery of every description

LINK-BELT COMPANY

Thirty-ninth Street and Stewart Avenue
CHICAGO, U. S. A.

Specialists in the design and manufacture of modern labor-saving appliances and equipment for the handling of raw materials or manufactured products, in bulk or packages

Branch Offices { New York City Pittsburg
 { New Orleans Minneapolis

Works at ——— Philadelphia Chicago Indianapolis

Branch Offices { St. Louis Denver
 { San Francisco Seattle



The three plants of this company are modern in every respect, and are thoroughly and efficiently equipped for rapid and economical production, those at Chicago and Philadelphia being devoted to engineering and general lines, and the one at Indianapolis being exclusively for the manufacture of malleable and high-speed steel driving chains. At each plant there is maintained a suitable engineering corps, operating under the direction of a practical and experienced management. The Chicago plant includes a fully equipped gray iron foundry of large capacity, and the company maintains a close business relationship with the best malleable and steel foundries of the country. The company's shipping facilities are unsurpassed, the various plants being located on belt lines connecting with all railways.

A varied line of general and special catalogs, pamphlets, etc., always available.

WEBSTER M'F'G Co.

ENGINEERS, FOUNDERS, AND MACHINISTS

Main Office and Works, 2410-2432 W. 15th St.
CHICAGO, ILL.

Established 1876

Incorporated 1882

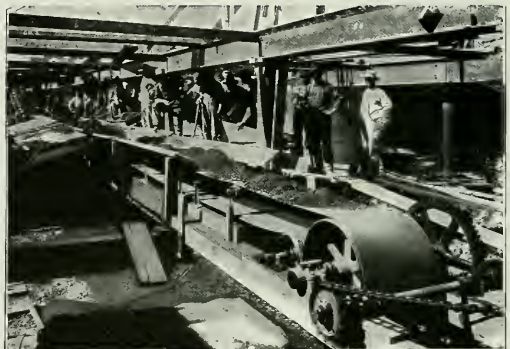
Re-incorporated 1903

Eastern Branch: 88-90 Reade Street, New York

Branch Works: Tiffin, Ohio



FLIGHT CONVEYOR OPERATING IN COAL YARD
This receives coal from "Ray" Dock Elevator



FLAT BELT CONVEYOR AT LOW COST FOR CONTRACTOR'S USE
The cut shows this style of Conveyor used in excavating for handling dirt

OUR LINE	Manufacturers of Elevating, Conveying and Power Transmitting Machinery for all purposes.
DESCRIPTION	For the continuous mechanical handling of Coal, Ores, Cement, Stone, Sand, Gravel, Grain, etc. Coal and Ash Handling systems for Plants and Public Buildings.
SERVICE	With our large works at Chicago and our recently erected extensive plant at Tiffin, Ohio, we have unusual facilities for manufacturing and exceptionally ready means of transportation. Our well known motto is "Quality First and Always."
EQUIPMENT	The works are thoroughly equipped with the latest Tools and Machinery, and are operated according to improved modern methods.
ADVANTAGES	We possess all of them for the ready and efficient handling of orders and their prompt shipment.
ESTIMATES	Our Engineering Department is equipped with a well trained corp of experienced Draftsmen and we are prepared to furnish careful lay-outs and estimates for all work in our line.

THE FRED W. WOLF COMPANY

Refrigerating and Ice-Making Machinery

Established 1867

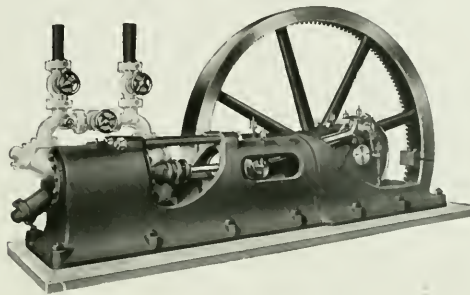
Incorporated 1887

Office and Factory

827-831 Rees Street, Foot of Dayton
CHICAGO, ILL.

Branch Offices

{ NEW YORK
ATLANTA
FORT WORTH
KANSAS CITY
SEATTLE



PRODUCTS

We are manufacturers of the Linde Ice Making and Refrigerating Machine, known in this Country as the "Wolf Linde." There are over 7,000 of these machines in operation throughout the world, 1,000 of which are in the United States, and of these we proudly claim 152 for Chicago.

DESCRIPTION

The Wolf Linde is a Horizontal Double Acting compression type machine, built for durability, reliability and economy of operation, all of which has been proven by the many in successful operation.

FACILITIES

We have the facilities to handle complete installations from 5 to 1,000 tons capacity.

ADVANTAGES

So many that we cannot enumerate them here. Write for our literature.

ESTIMATES

Will be gladly furnished no matter how large or small your requirements in our line may be.

GENERAL INFORMATION

We also carry a complete line of the famous Wolf Ammonia fittings which have never been equaled.

We can also supply you with everything required around an Ice-making or Refrigerating plant.

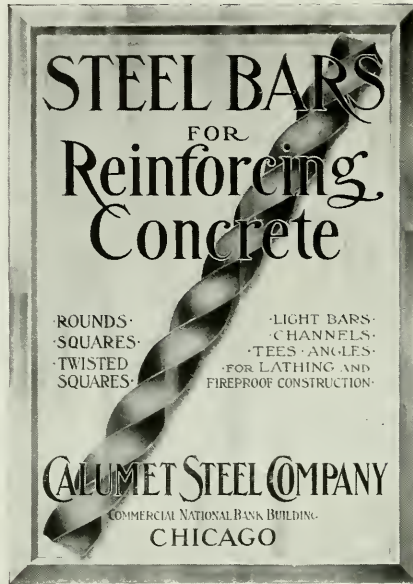
WRITE FOR OUR CATALOGS.

CALUMET STEEL COMPANY

COMMERCIAL NATIONAL BANK BUILDING

CHICAGO

Works: Chicago Heights



STOCK AND SHIPMENTS

We carry at our mill warehouse a large stock of all sizes in rounds, plain and twisted squares, and are in position to cut to your specified lengths and make an immediate shipment upon receipt of specifications.

BENDING

We are prepared to do your bending at our mill, thereby saving you the inconvenience and high cost in the field. Send us your detailed drawings for estimate.

CALUMET STEEL COMPANY
Commercial National Bank Building
CHICAGO

ALLIS-CHALMERS COMPANY

MILWAUKEE, WIS.

Offices in all the Principal Cities of the World

PRODUCTS

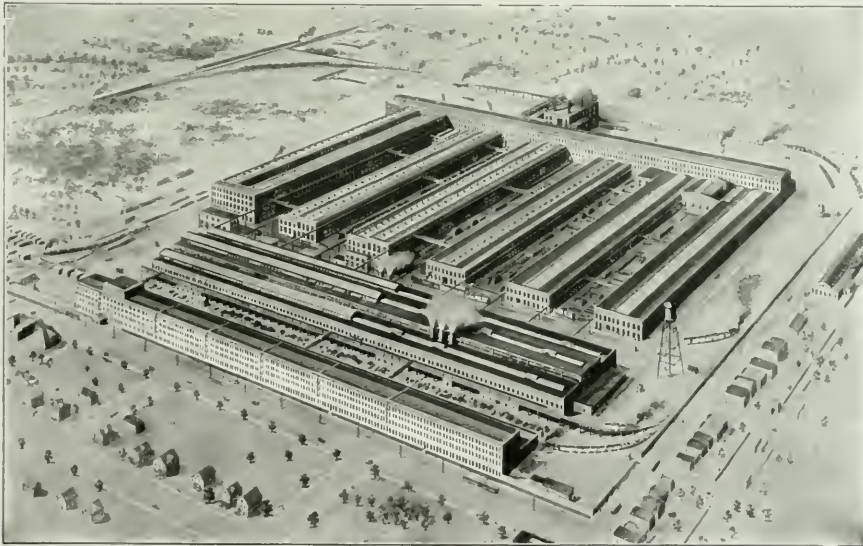
Largest manufacturers in the world of Power Machinery, Electric Generators, Pumping Machinery, Saw Mill Equipments, Flour Mill, Crushing, Cement-Making, Mining and Ore Reduction Machinery, Electrically Operated Air Brakes, Power Transmitting Machinery, etc., etc.

DESCRIPTION

The work of Allis-Chalmers Company is carried on in the following departments: Electrical, Steam Turbine, Steam Engine, Gas Engine, Pumping Engine, Hydraulic Turbine, Mining Machinery, Crushing and Cement Machinery, Saw Mill, Flour Mill, and Air Brake. The products of each of these departments represent the highest achievements in machinery production.

FACILITIES

Six Plants, in Milwaukee, Chicago, Cincinnati and Scranton, with every possible equipment for manufacturing machinery. Allis-Chalmers Company is in position to accomplish what no other company in existence can perform—the construction of complete power equipments of every description, with auxiliary electrical apparatus, in one set of shops and under one management.



West Allis Works of Allis-Chalmers Company

*Largest iron and steel
supply house in the world*

FLOOR SPACE
750,000 SQ. FT.

CAPACITY
150,000 TONS



GENERAL OFFICES AND WAREHOUSES, 16TH AND ROCKWELL STREETS, CHICAGO

Structural shapes, plates, bars, bands, sheets, rivets, boiler tubes, steel workers' supplies, fittings and machinery

This Chicago stock, supplemented by our machinery—offers

For the Shop—a complete stock of material, fittings and tools for immediate shipment, and the advantage in case of emergency of the use of the most modern metal working machinery and facilities

For the Builder, Architect and Contractor—practical insurance against delay in construction due to belated shipments of material, thus assuring early rental income, and a ready source of supply for emergency needs

ESTABLISHED 1842

INCORPORATED 1888

JOSEPH T. RYERSON & SON

EDWARD L. RYERSON, PRESIDENT CLYDE M. CARR, VICE-PRESIDENT

IRON STEEL MACHINERY

CHICAGO

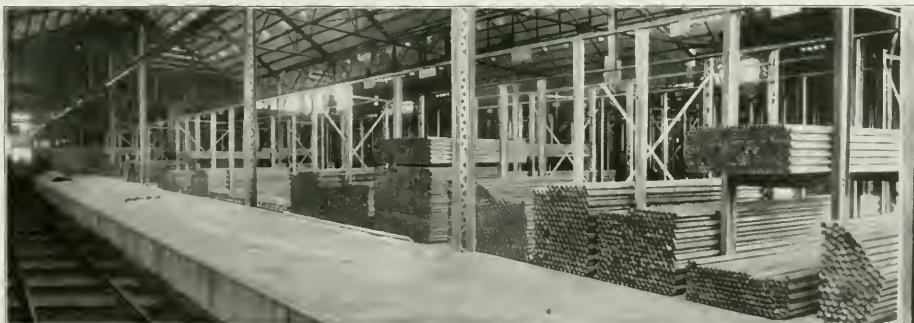
Capacity 150,000 Tons—Floor Space 750,000 Square Feet



INTERIOR VIEW OF SOUTH STRUCTURAL WAREHOUSE. JOSEPH T. RYERSON & SON.



ONE CORNER OF PLATE FLOOR, NORTH WAREHOUSE. JOSEPH T. RYERSON & SON.



SECTION OF TUBE FLOOR, SHOWING RAILROAD FACILITIES. JOSEPH T. RYERSON & SON.

NORTH WORKS
ILLINOIS STEEL COMPANY

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PRODUCTS ROLLED STEEL FROM WAREHOUSE STOCK.

DESCRIP- We carry a large and complete stock of STEEL
TION BEAMS, CHANNELS, TEES, ZEEs, SHEARED
 AND UNIVERSAL MILL PLATES, FLATS,
 ROUNDS, PLAIN AND COLD TWISTED
 SQUARES, RIVET RODS, RIVETS, ETC. These
 materials are in accordance with Manufacturers' Standard
 Specifications. The structural shapes, plates and bars are
 Railway Bridge Quality; rivets and rivet rods are Boiler
 Rivet Quality.

SERVICE These materials are stored in large warehouses under elec-
 tric cranes. Most efficient cutting machines are adjacent to
 the stock, enabling us to furnish promptly large as well as
 small quantities of materials cut to lengths and sizes required.

 For the benefit of the trade, we issue every Saturday a
 WEEKLY STOCK SHEET showing the quantities of
 each of the different kinds and sizes materials on hand.

DURAND-STEEL LOCKER COMPANY

125 Monroe Street :: Chicago, Illinois



Showing DURAND-STEEL LOCKERS in Continental National Bank

Manufacturers of DURAND-STEEL LOCKERS, a necessity for every building. Fireproof, petty thief proof and germ proof. DURAND-STEEL LOCKERS are in use in every modern building in and around Chicago and are endorsed by all leading architects and engineers. We will gladly furnish plans and estimates on any style in any quantity.

DURAND-STEEL LOCKER COMPANY

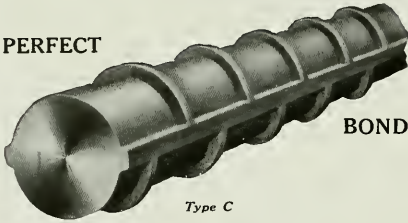
125 MONROE STREET, CHICAGO, ILLINOIS

Corrugated Bar Company

1416 National Bank of Commerce Building, ST. LOUIS, MO.

AGENTS IN ALL LARGE CITIES

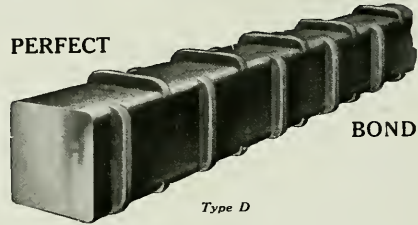
PERFECT



BOND

Type C

PERFECT



BOND

Type D

Standard Sizes Corrugated Rounds

SIZE IN INCHES	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
Net area in sq. in. . .	.11	.19	.25	.30	.44	.60	.78	.99	1.22
Weight per ft. in lbs. . .	.38	.66	.86	1.05	1.52	2.06	2.69	3.41	4.21

Standard Sizes Corrugated Squares

SIZE IN INCHES	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$
Net area in sq. in. . .	.06	.14	.25	.39	.56	.76	1.00	1.26	1.55
Weight per ft. in lbs. . .	.22	.49	.86	1.35	1.94	2.64	3.43	4.34	5.35

PRODUCTS

CORRUGATED BARS.

DESCRIPTION

The first and best deformed bars.

SERVICE

The best reinforcement for concrete—certain, safe and economical.

FACILITIES

Rolled at eight of the country's largest mills. IN STOCK IN CHICAGO and fourteen other cities.

ADVANTAGES

Perfect material—perfect bond. Immediate shipment—lowest cost.

ESTIMATES

Quotations and estimates on the reinforcement of any class of reinforced concrete structure will be cheerfully and quickly furnished by any of the company's sales offices.

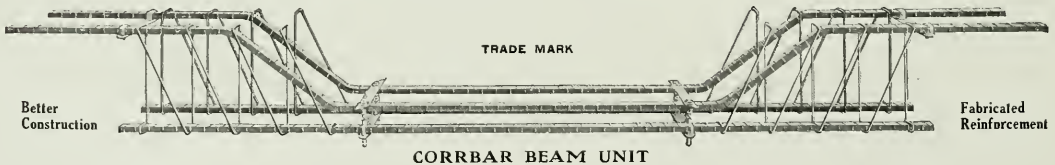
CORRBAR BEAM UNITS

The only commercially practicable unit reinforcement.

Accuracy, security and economy in the reinforcement of concrete beams and girders.

Plant at Blasdel (Buffalo), N. Y., with a daily capacity of 300 tons of fabricated reinforcement.

Safety and accuracy in construction at less than the cost of loose bars.

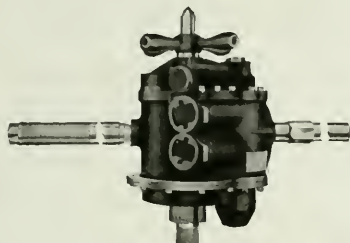


A HALF CENTURY OF CHICAGO BUILDING

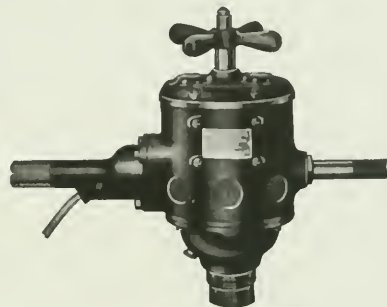
A Few Labor and Time Savers Manufactured by

CHICAGO PNEUMATIC TOOL COMPANY

FISHER BUILDING
CHICAGO
U. S. A.

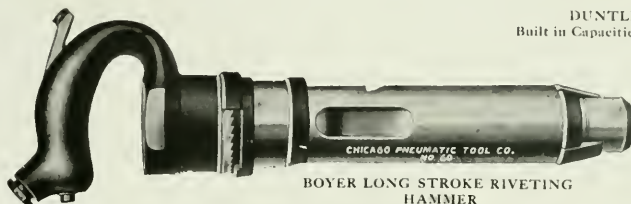


LITTLE GIANT AIR DRILL
Built in Capacities up to 3 inches, in iron or steel



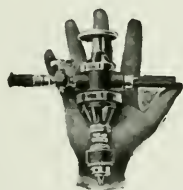
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Built in Capacities up to 3 inches, in iron or steel

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HAMMER**

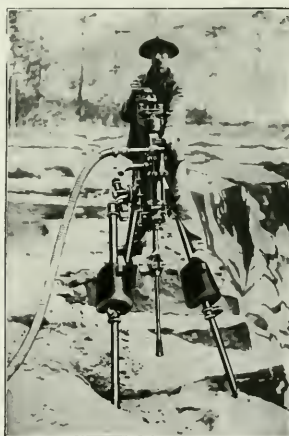
WRITE FOR
CATALOGUES



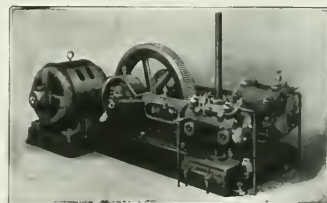
**CHICAGO MIDGET AIR
DRILL**
Capacity $\frac{3}{16}$ inch Iron



**MIDGET ELECTRIC
DRILL**
Capacity $\frac{3}{16}$ inch Iron



CHICAGO GIANT ROCK DRILL
Operating in Quarry of United States Crushed
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"FRANKLIN" AIR COMPRESSOR
Motor Driven

Tools Sent on Trial
Anywhere

Everything Liberally
Guaranteed

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CHICAGO PNEUMATIC TOOL COMPANY

CHICAGO

Branches Everywhere

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H. E. Bullock, Pres.

Organized 1884

J. E. Bullock, Secy. & Treas.

Illinois Malleable Iron Co.

1801-1825 Diversey Boulevard, Chicago, Ill.
and North Paulina

DEPARTMENTS

MALLEABLE FOUNDRY—Refined Malleable Iron
Castings to order.

GRAY IRON “ Castings to order.

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PIPE FITTINGS—Manufacturers of Malleable and Cast
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&c., &c.

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Heaters, &c.

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Plant occupies 20 acres of land on C. & N. W. Ry. tracks at junction of Diversey Boulevard

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Commercial National Bank Building

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Complete Designs of Electric Light, Power and Railway Plants, and Power
Transmission Systems, with Supervision of Construction: Steam, Gas or Water Driven.

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Financial Reports on the Physical Value and the Earning Capacity of Industrial
Enterprises, for Bankers and Underwriters.

WHEN YOU BUILD

Safety and ultimate economy require that you build fireproof. To carry fireproof construction to its logical conclusion, it is necessary to have a fireproof roof.

For this we would recommend our **MARGARET** Old Style Roofing Plate. This plate is made by the Palm Oil Process from perfect, carefully annealed black plate, coated with pure tin and new lead. Carries a 40 pound coating, and as a protection to you this plate is stamped with brand, gauge and weight; thus insuring a positive guarantee of genuineness and worth. To manufacture this plate requires fifteen different operations from the black plate to the finished product, which gives assurance of exclusiveness that prevents duplication. It is perfectly mottled and uniformly coated, and is equal, if not superior, to any plate on the market today.

Metal Ceilings and Side Walls is another of our products which are conducive to fireproof building. The surpassing beauty of our designs is one of their most prominent features—designs representing the cleverest handiwork of artists. These together with an extensive array affords an appropriate choice for the most exacting need. Our Enameled Ceilings can be furnished in any design made by us and in any color arrangement. Colors are burnt on; the gold decoration will not tarnish and colors will not fade. This unique character is exclusively confined to Metal Ceilings of our manufacture.

Kindred lines of Sheet Metals for fireproof construction are distinctively described in our catalogue, and we would emphasize the wisdom of investigation.

Wheeling Corrugating Co., 168-172 North Clinton Street, Chicago, Ill.

C. A. CARLSON

TELEPHONE MONROE 3612

JOHN BJORN

Chicago Iron & Steel Works

Machinery Forgings
Pipe Hangers and Clamps
Tools and Tool Dressing
Sheeting Caps
Truss Iron and Bolts

IRON WORK FOR BUILDINGS

AND

GENERAL BLACKSMITHING

Beams, Channels, Girders
Lintels, Iron Stairs
Window Guards
Store Fronts
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733 Fulton Street, Chicago

Featherstone Foundry & Machine Co.

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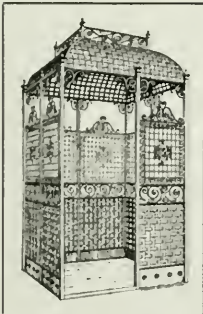
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PLANTS:

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GREY IRON CASTINGS
OF ALL KINDS

RAILROAD AND SEWER CASTINGS
A SPECIALTY



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Office and Warehouse: 100-102 Lake Street, Chicago, Ill.

Foundry and Shop: Chester Street, Clybourn and Fullerton Avenues

Ornamental Iron and Bronze Work; Iron, Bronze and Brass Founders, Spiral Columns and Steel for Concrete Re-enforcement.

Designers and Manufacturers of
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Catalogue on Application

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North Works and General Offices

349 to 359 West Illinois Street
Telephone Main 1584

South Works

96th Street and River
Telephone South Chicago 654

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ALBERT MOHR, *Vice-President*

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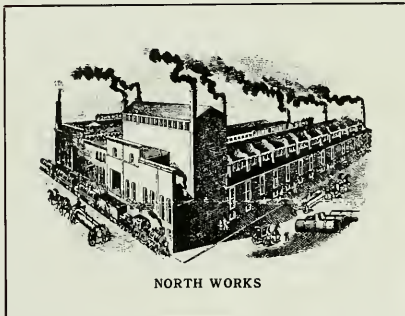
WM. J. MOHR, *Treasurer*

JOHN MOHR & SONS

Engineers, Designers and Machinists

for

Steel Plate and Structural Work of Every Description



Boilers

of All Kinds

of Highest Grade
and

Efficiency

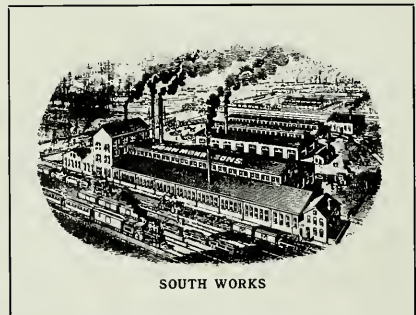
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Hot Stoves

Conventers

Cupolas

Sterilizers, etc.



*In fact, Anything and Everything made of Light and Heavy
Steel Plate or Structural Material*

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OF ALL KINDS AND
FOR ALL USES

Tested and Approved by Underwriters' Laboratories

Voigtmann & Company

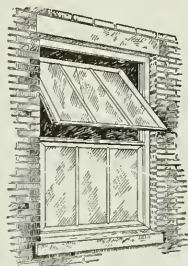
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Chicago

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J. C. McFARLAND & CO.

FIREPROOF METAL WINDOWS



Double Hung and Pivoted

Accepted by the Underwriters

SKYLIGHTS—SHEET METAL WORK
TILE, SLATE AND COMPOSITION
ROOFING

REPAIRS OF ALL KINDS OUR SPECIALTY



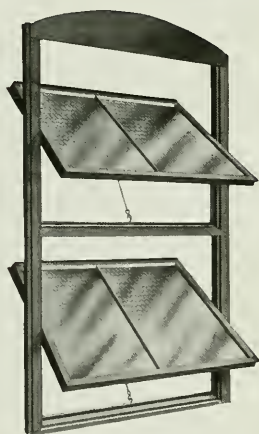
ART METAL DOORS AND TRIM

Enamel Finish, Imitating Any Wood

Contracts Taken Anywhere

27TH STREET AND 5TH AVENUE
CHICAGO, ILL.

213-215 EAST 44TH STREET
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DOUBLE PIVOTED

JOHN A. KNISELY

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KNISELY BROS. Incorporated

MANUFACTURERS OF

**Automatic Iron and Copper Window Frames
and Sashes for Wire Glass**

APPROVED AND ACCEPTED BY THE FIRE INSURANCE UNDERWRITERS

**Slate, Tin, Tile and Corrugated Iron Roofing
Metal Cornices and Skylights**

Telephones Calumet 1266 and 1267

Fifth Avenue and 28th Place ∴ ∴ CHICAGO

Kniseley Brothers, 28th Place and Fifth Ave., manufacturers of Fireproof Windows, Hollow Metal and Wood Core Doors, all of which have been tested and approved by the Underwriters Laboratories. Each and every window and door being inspected by the laboratory and bears their label before leaving our factory. These windows are glazed with wire glass, either ribbed or polished, as may suit the owner. We are prepared to install our windows and doors any place in this country, or we can furnish these materials F. O. B. any city or town and same can be installed by local mechanics.

Our factory, situated at 28th Place and Fifth Ave., covers almost an entire block, is equipped with the latest modern machinery, facilitating this work, at all times.

We will gladly furnish estimates to any part of the country. Plans may be forwarded and we will return same promptly. Catalogues will be furnished on application.

The Hawley Down Draft Furnace Co.

PARIS
NAPLES

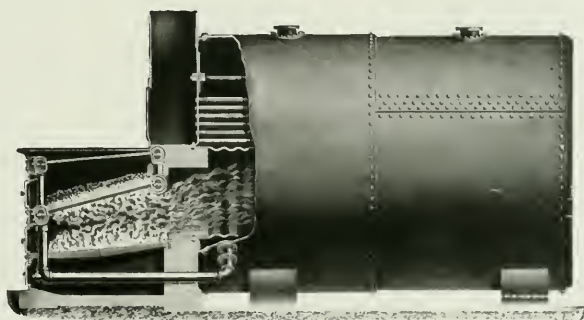
CHICAGO

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The Down Draft System of "Smokeless Combustion"

Established 20 Years

Over
8000
in use



Adopted by
U. S.
Government

Can be
Attached to
Any Make
or Size of
Boiler

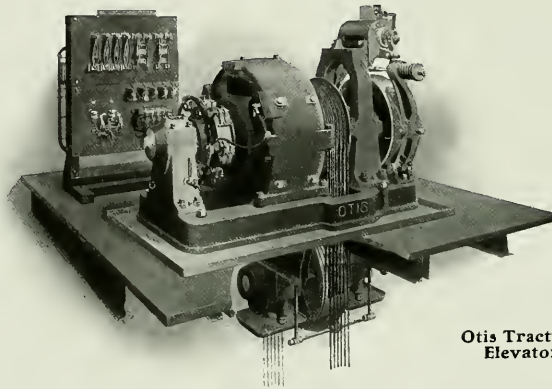


Catalog
and
Specifica-
tions upon
request

Otis Elevator Company

Builders of All Types of Elevators

Otis Traction Elevator



Otis Traction
Elevator

is the highest development of elevator apparatus known at the present time. This type of elevator is being successfully operated in the two highest buildings of the world—*Metropolitan Life* and *Singer Towers* of New York City. Also in the *Majestic*, *Cook County Court House*, *Peoples Gas*, *City Hall*, *Republic* and *Blackstone Hotel Buildings* and will be installed in the *Hotel Sherman* and the *Kesner Building* of Chicago.

OTIS ELEVATOR COMPANY

OFFICES IN ALL THE PRINCIPAL CITIES OF THE WORLD

Chicago Office :: :: Railway Exchange Building

Otis Elevator Company

Builders of All Types of Elevators

Hand Power Elevators

for use in stables, warehouses, mills and factories; also for private houses as trunk lifts; in hospitals for invalids, etc. Can be installed at a low cost of \$100.00 upwards.

Automatic Push Button Control Elevators

make the private house complete, operating with the greatest ease, and can be operated either by the youngest or the oldest in the household.

Hydraulic Elevators

of all types for passenger and freight service.

Mine and Furnace Hoists

using both electricity and steam.

Safeties

The safeties on all our elevators are of the highest improved type, the result of over half a century of successful elevator manufacturing.

OTIS ELEVATOR COMPANY

OFFICES IN ALL THE PRINCIPAL CITIES OF THE WORLD

Chicago Office :: :: Railway Exchange Building

ART METAL CONSTRUCTION CO.

Fine Metallic Furniture

FOR

Banks, Trust and Insurance Companies, Public Buildings, etc.

Established 0000

JAMESTOWN, N. Y.

Main Office and Works:
Jamestown, N. Y.

Branch Offices:

NEW YORK, 349 Broadway
CHICAGO, Merchants Loan and Trust Bldg.
BOSTON, Tremont Bldg.
PHILADELPHIA, Witherspoon Bldg.

BALTIMORE, Equitable Bldg.
SAN FRANCISCO, Flood Bldg.
CINCINNATI, Union Trust Bldg.

ATLANTA, Candler Bldg.
DENVER, Jacobson Bldg.
CLEVELAND, Williamson Bldg.
WASHINGTON, 1433 H St. N. W.



PRODUCTS

Manufacturers of High Grade Steel Devices, viz.:

Vertical Letter Files.	Card Index Files.
Document and Letter Files.	Roller Book Shelves.
Pigeon Holes and Drawers.	Legal Blank Cases.
Vault Omnibuses.	Check Files.
Deposit Ticket Files.	Safety Deposit Boxes.
Library Shelving.	Bank Equipments, Counters, etc.
Desks and Tables.	Postal Bag Racks.

Also—Bronze Doors, Grille, Castings, etc. Metal Doors and Window Frames.

DESCRIPTION

The material employed in these productions is fine steel plates especially rolled for the purpose, without scale or buckle and are double annealed and pickled. The finishes are fine baked enamels in various colors or imitations of woods.

SERVICE

We are prepared to furnish catalogues and information as to our product. Will send representative to confer with you at any time and lay out your work, furnishing plans and specifications.

FACILITIES

This Company has the largest and most complete plant in the world for the exclusive manufacture of this product. Occupies six acres floor space and employs 1,200 mechanics.

ADVANTAGES

Steel Furniture is practically indestructible; is not affected by moisture or changes in temperature; is sanitary and cleanly, and protects its contents from fire.

ESTIMATES

This Company will be glad to furnish estimates on any work in this line which you may require and solicits inquiries.

GENERAL INFORMATION

On bronze work we are prepared to give special attention. We make our own models and patterns, and have our own foundry, thereby getting the very best results. Architects' details are followed exactly.

Our Metal Doors are not excelled. They have passed the National Board of Underwriters' tests.

On Bank equipments we furnish complete marble, bronze and metal equipment.

P. L. HEDBERG, PRESIDENT

G. F. HERHOLD, SEC. AND TREAS.

Chicago Metal Weather Strip Co.

(INCORPORATED)

ESTABLISHED 1903

HOME OFFICE AND FACTORY
1617 NORTH TROY STREET
NEAR WEST NORTH AVENUE

TELEPHONE HUMBOLDT 3715

CHICAGO

PRODUCTS	We manufacture and install various patterns of Metal Weather Strips adaptable to all styles of windows and doors.
DESCRIPTION	In the Chicago Metal Weather Strips we employ the best metal, namely, spring-tempered copper and zinc.
SERVICE	Perfect window slides, draft and dust shields.
ADVANTAGES	Their installation is permanent, combining comfort, cleanliness and convenience. No storm windows required.
GENERAL INFORMATION	They are mechanically correct. The installation of thousands of windows during the past years has proved them to be absolutely perfect and durable.

Northwestern Yeast Co.



General Offices :: 1750 North Ashland Avenue :: Chicago, Ill.

Manufacturers of *Yeast Foam* and *Magic Yeast*

brands well known to the makers of good Bread. Each brand sells to the consumer for five cents per package, each package containing enough for thirty loaves of bread.

Yeast Foam and *Magic Yeast*

are sold through the retail grocer, and every package is guaranteed to the consumer by the makers. This yeast produces a loaf of bread with the sweet nutty flavor so desirable—bread that keeps fresh and moist. The old-fashioned kind seldom equaled.

Free Samples and Recipe Booklets may be had on application.

P. ALBERT POPPENHUSEN, PRES.

JOSEPH HARRINGTON, SEC'Y

HERMAN A. POPPENHUSEN, TREAS.

MANUFACTURERS
OF
GREEN CHAIN
GRATE STOKERS

Green Engineering Co.
Commercial National Bank Building
Chicago, Ill.

GENERAL FOUNDERS
AND
MACHINISTS

WORKS AT
EAST CHICAGO, IND.

Years ago Chicago deserved its title "The Dirty City."

Why? It was smoke enveloped.

Our cheapest fuel—from the Illinois coal bed—rich in the smoke producing element—volatile—was extensively and carelessly burned.

A belching stack then popularly indicated prosperity and a busy power plant.

Now steam plant owners agree that such condition indicates waste, poor boiler economy, excessive coal bills, and a dirty city. Engineers have learned that properly designed furnaces and mechanical stokers are not only necessary for smokeless combustion, meaning a cleaner Chicago, but also result in greater economy.

The Green Engineering Co. have equipped 100 plants in the city of Chicago with Green Chain Grate Stokers, representing a horse power of 150,000. All of these plants operate smokelessly and economically.

These facts should be realized and acted upon by the public, then Chicago will rid itself of its unpleasant nick-name.

Have you, as a steam plant owner, grasped the opportunity to investigate the improvements that could be made in your boiler room or taken advantage of service offered by the Green Engineering Company to effect economies in the production of steam and abatement of smoke? Our experience and talent is at your disposal.

GREEN ENGINEERING COMPANY,
115 Adams St., Chicago, Ill.

CHAMBERLIN METAL WEATHER STRIP CO.

ALL-METAL EQUIPMENT FOR WINDOWS AND DOORS

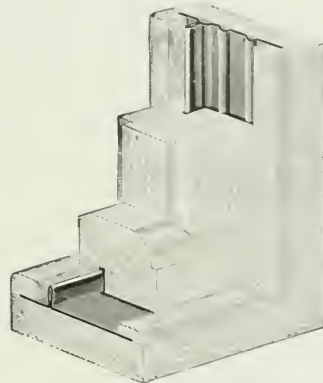
Chamberlin Leakage Stop System

570 OLD COLONY BUILDING
CHICAGO, ILL.

Main Factory: DETROIT, MICH.
Offices all large cities



Meeting rail equipment



Shows Chamberlin Corrugated Strip and its relation to groove in sash, with plane strip at the bottom

PRODUCTS DESCRIPTION

Manufacturers and Installers of All Metal Weather Strips.
Our improved method of All Metal Equipment that absolutely stops the leakage where placed around windows and doors and assures ease in the operation of them.

SERVICE

We are especially prepared for furnishing work on large buildings, such as Schools, Hospitals, Hotels and Office Buildings, as well as fine residences and other buildings.

FACILITIES AND EQUIPMENT

The Chamberlin plant at Detroit is supplied with all modern conveniences and equipped with special machinery for the manufacture of our product, for which Chicago and vicinity is one of its greatest sources of distribution and where we keep a large stock on hand at all times for distribution and installation in this part of the Central West.

ADVANTAGES

It is much more than an ordinary weather strip, being constructed entirely of a non-rustable metal of sufficient strength for the greatest durability, and will last as long as the building on which it is placed.

It stops the drafts on all windows and doors where placed and assures their easy operation, assuring a saving of from 15 to 40% in fuel bills and enables control of ventilation.

It also shuts out noise, dirt and soot, strengthens the sash and stops the rattling of windows.

It can be applied to all kinds of windows and doors, old or new, but if provided for before the heating plant is installed we guarantee enough can be saved in that from what is usually figured to pay the first cost of our equipment.

ESTIMATES

We will gladly furnish estimates for the installation of our equipment upon application at our Chicago office.

GENERAL INFORMATION

Our improved strip is protected by United States and foreign patents and can be obtained only through this and our branch offices representing our product exclusively.

DAHLSTROM METALLIC DOOR COMPANY

Manufacturers of the

"Dahlstrom" Patent Sheet-Metal Doors, Trim, and Accessories

JAMESTOWN, N. Y.

Branch Offices:

NEW YORK, N. Y., 299 Broadway
CHICAGO, ILL., 542-543 Monadnock Bldg.
SAN FRANCISCO, CAL., 255 California St.
PHILADELPHIA, PA., Real Estate Trust Bldg.
ST. LOUIS, MO., National Bank of Commerce

PRODUCTS

We are the originators of Hollow Metal Doors, Electrical Cabinets and Cut Out Boxes, Partitions, Wardrobes, and complete trim including Picture and Wire Moulding, Capping, Chair Railing and Cold Drawn Moulding for all purposes in Steel, Brass and Bronze.

DESCRIPTION

Our patents cover broadly the most desirable features and insure simplicity of construction, producing absolute rigidity without excessive weight. Our welded joints and sealed double lock seams make the connections invisible, adding beauty and strength to the unsurpassed fireproof qualities of our doors. The corners of our casings are mitered and welded. The side and head jambs are shipped knocked down to provide for adjustment in the rough openings in the building.

No wood is used but we fit all hardware and provide proper reinforcements of steel for same. Any kind of hardware desired is therefore permissible. Templates of hardware must be at our factory by the time actual work on the doors is commenced. Time and expense will be saved to order all hardware interchangeable and packed with machine screws.

Corrosion is guarded against by a thorough cleaning of the steel and careful application of metallic paint on inside and outside.

Metallic ring is prevented by use of felt and cork cushions. The wearing quality of our finish is enhanced by our baking method and the use of only the best grades of material applied by hand.

We undertake to faithfully reproduce any color, wood or metal finish.

We maintain a large force of expert tool makers in order to meet demands for specially designed shapes, but we are constantly adding to our stock designs (catalogue of which we shall be pleased to send on application), which are available for immediate use.

MOULDINGS

Our cold drawn steel mouldings are for many purposes rapidly replacing the imported heavy-hot rolled sections heretofore so extensively used by Ornamental Iron Works in stairs, store and elevator front work, etc., and every Architect should make sure to have one of our catalogues for ready reference. These mouldings are furnished to the trade in lengths to suit.

OFFICIALS ENDORSEMENT

The National Board of Fire Underwriters have tested and approved our doors and their labels of inspection are furnished when desired. They also have the approval of the Department of Buildings of large cities.

ADVANTAGES

Besides meeting a practical purpose by being fireproof, their artistic and superlative finish make our products available for the highest classes of buildings and give tone to the buildings where used as well as sense of security to hotel guests. Apartments and offices rent quicker, and the material being finished before shipped from the factory, the annoyance caused and time lost by having the trim painted after erection is obviated.

The finish on our material is practically indestructible, and our doors do not swell or warp, therefore the expense of these items is entirely eliminated, making a great saving in the maintenance of any building.

Our doors absolutely prevent the spread of fire, therefore a great saving in insurance is made possible.

FACILITIES

Our new factory additions give us floor space of over one-eighth of a million square feet. Our equipment includes special machinery, designed and built especially for Hollow Metal Door work, and a well equipped tool room, making our facilities for prompt execution of orders unsurpassed.

SERVICE

To us it is a pleasure to co-operate with Architects, and we will adapt any rough sketch or suggestions to our construction and submit adequate drawings for approval.

We particularly invite communications regarding estimates in all branches of our work. Catalogue sent upon request.

PRICES

To quote intelligently we should be informed of styles of doors, sizes of openings, thickness and nature of wall and whether openings are to be trimmed on both sides. Estimates, designs and further information submitted on application.

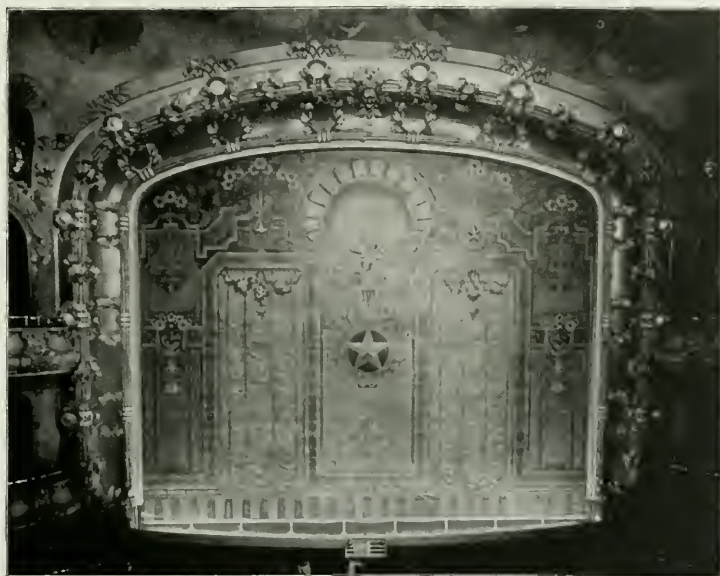
Contracts solicited for F. O. B. factory shipments as well as for the work installed anywhere.

GUARANTEE

The Dahlstrom Metallic Door Company guarantees that all materials and workmanship used in the manufacture of their products are of the very best quality and that the work they install will give satisfaction.

THE S. H. HARRIS CO.

736-738 Pearce Street



Manufacturers of

Special Safes, Vault Doors and Linings,
Fireproof Doors for Division Walls,
Stairways, Elevator Shafts, etc. Steel
and Asbestos Theatre Curtains.

We are prepared to furnish expert advice as to proposed equipments, with blueprints and estimates. A specialty is made of furnishing and installing equipments anywhere in the United States to comply with building ordinances and Underwriters' requirements.

THOMAS ELEVATOR COMPANY

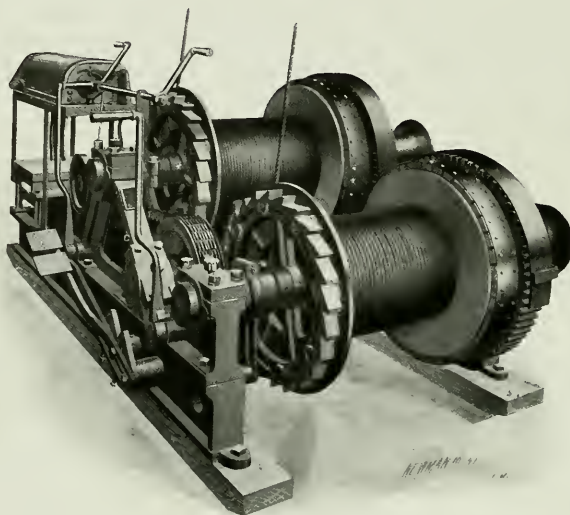
Manufacturers of

Building Material Elevators

20-22 So. Hoyne Avenue

Chicago, Illinois

Telephone West 391



Patent Double Drum Electric Chain Drive Hoist

PRODUCTS

Electric Hoisting Machinery.

DESCRIPTION

The products of the Thomas Elevator Company represent the latest and most improved Electric Building Material Hoists for contractors' use. The Thomas Silent Chain Drive Double Drum Electric Iron Hoist is in use in every large city in the United States, and represents the most improved type of hoisting machinery yet devised.

ADVANTAGES

Electric Hoists are capable of doing any work that can be done by steam, and have the important advantages of cleanliness, noiselessness and absolute lack of vibration.

FACILITIES

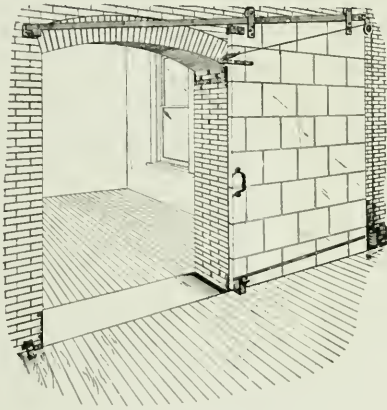
The Thomas Elevator Company is the only company in the market making a specialty of electric hoisting machinery for contractors' use. This company was the first in the field in this line and claims more experience in this work than any other company.

Variety Manufacturing Company

Sacramento and Carroll Avenues

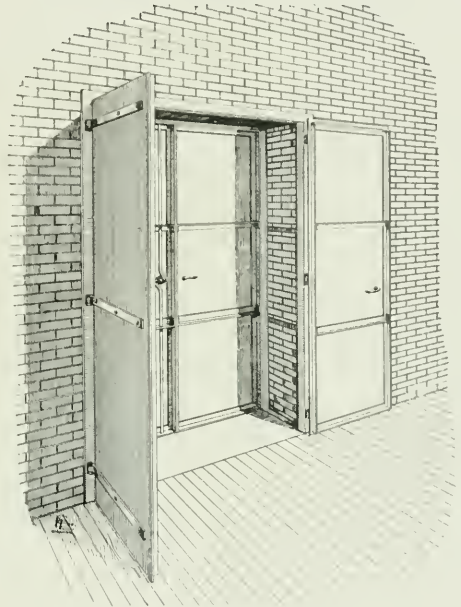
CHICAGO, ILLINOIS

**Tin Clad
Underwriters Fire Door**



Showing standard Underwriters Tin Clad Sliding Fire Wall Door, built of three thicknesses $\frac{7}{8}$ x 6 inch dressed and matched white pine, tinned according to Underwriters' specifications. We guarantee this door to be acceptable to the Underwriters anywhere in the country. We sell the hardware only, or both door and hardware, f. o. b. Chicago, or we will take contracts to erect.

**Standard
Double Swing Iron Door**



Showing Standard Swinging Steel Fire Wall Doors hung on angle frames. We guarantee these doors to be acceptable to the Underwriters anywhere in the country, and sell them either f. o. b. Chicago, or take contracts to erect complete in place.

Manufacturers of

**Rolling Steel Doors
Cross Horizontal Folding Doors
Cross Counter-balanced Freight Elevator Doors
Approved Iron and Tin Clad Fireproof Doors
Cross Compound Slide-up Doors
Steel Window Shutters**

Phone West 23

Elevator Supply & Repair Company

New York

Chicago

San Francisco

Electric Signals for Passenger Elevators

Mechanical Floor Indicators for Elevators

Automatic Freight Elevator Doors

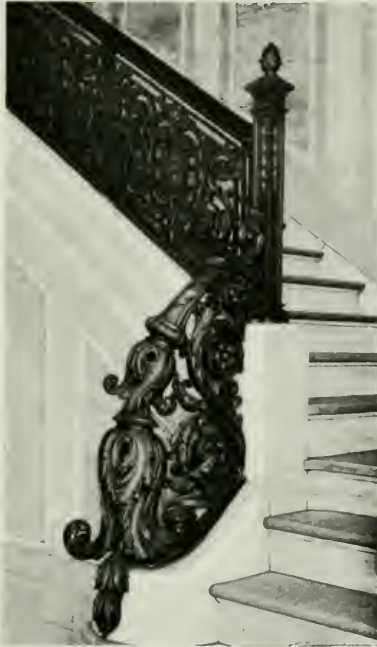
Fireproof Steel Safety Curtains and Other Apparatus for Theatres

Expressmen Call System for Office and Loft Buildings

Ornamental Iron and Bronze Castings

We carry on a general engineering business and are prepared to execute orders for and develop special mechanical and electrical apparatus. We execute complete from Architects' drawings ornamental bronze or iron castings. Having a thoroughly equipped plant, including machine shops, iron and bronze foundries, pattern shop and plating plant, we are enabled to guarantee high-class work

ESTIMATES PROMPTLY FURNISHED





Main Stair, American Trust and Savings Bank, Chicago
JARVIS HUNT, ARCHITECT

ORNAMENTAL IRON & BRONZE

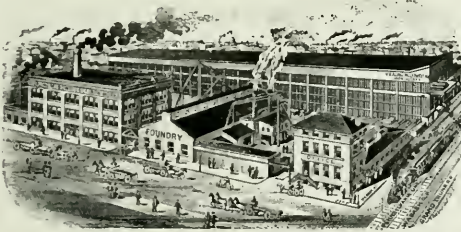
STAIRS, RAILINGS, GATES
ELEVATOR ENCLOSURES
COUNTER SCREENS
MEMORIAL TABLETS
MAUSOLEUM WORK
LAMP STANDARDS, Etc.

The Winslow Bros. Company

New York   Chicago

San Francisco

Agencies in All Principal Cities of United States



LOUIS VIERLING, Pres. and Treas.

C. J. VIERLING, Vice-Pres.

NORMAN SPEIGHT, Sec'y



CALUMET 364.

Vierling, McDowell & Co.

Manufacturers of

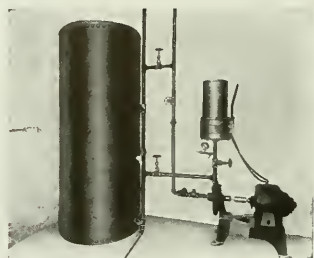
**Structural and Ornamental
Iron and Steel.**

Office and Works: 23rd St. & Stewart Ave.

Chicago.

Established in 1882, since which time steady progress has been the means of assisting very largely in the construction of many prominent public, mercantile and office buildings, both here and in numerous other cities throughout the West and Northwest.

Have recently erected new buildings specially equipped with the latest improved machinery, including two sixty feet electric travelers, and we are now fabricating the structural iron and steel for several large buildings, including that of the Crane Company, being constructed at Canal and 15th Streets, this city; also for all the buildings of the Corn Products Refining Company, located at Argo, Ill. Catalogue on application.



Automatic Electric
WATER SYSTEM

STEAM & WATER HEATING

MECHANICAL VENTILATION

ACME AIR-WASHERS

COOLING OF BUILDINGS

Hot Air Pumps

Electric Pumps

COMPLETE POWER PLANTS

Manufactured and Installed by

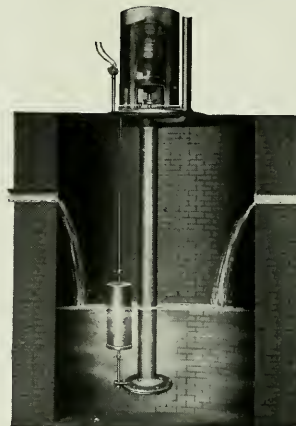
THOMAS & SMITH, Inc.

116-118 NORTH CARPENTER STREET

Telephone Monroe 5941

CHICAGO, ILL.

Sewage Pumps Bilge Pumps Cellar Drainers



Sewage and Bilge Pump



(PATENTED)

Cyclone Blow Pipe Co.

Improved Cyclone Dust Collectors Automatic Furnace Feeders Steel Plate Exhaust Fans and Galvanized Steel Exhaust and Blow Pipe Systems

Our Specialty: SLOW SPEED LOW POWER SYSTEMS

Complete Systems designed, manufactured, installed and guaranteed.
Old systems remodeled on modern lines on most economical plans.
Supplementary systems added where present systems are outgrown.
Defective systems corrected and put in proper working order.

541 to 553 West Jackson Boulevard, CHICAGO, ILL.

The Strauss Self Balancing Window

in various positions of openings



Made in Steel or Wood.

No chains, weights, pulleys or springs.

Tight without weather strips.

Requires no attention after installation.

Always easily and quickly operated.

Permanent.

The most perfect fresh air device in the world.

Cheap because best.

THE STRAUSS SELF BALANCING WINDOW CO.

902 Fort Dearborn Building Chicago, Illinois

Wm. Horn Structural Iron Works

336 to 346 North Leavitt Street, Chicago

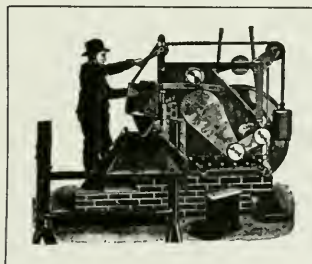
Telephone West 1018

Beams

Channels

Angles

Tees and Zees



Cutting

Punching

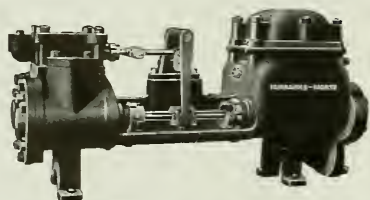
Riveting

Erecting

Truss and Girder Work

Horn's Ceiling Clip

FAIRBANKS-MORSE



Steam Pumps

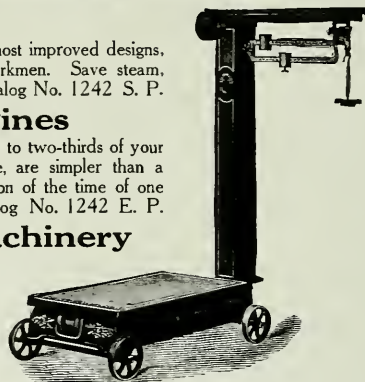
for every service. Built from the most improved designs, of the best materials, by expert workmen. Save steam, repairs and trouble. Send for Catalog No. 1242 S. P.

Producer Gas Engines

and Power Plants will save one-half to two-thirds of your fuel bill. They take up less space, are simpler than a steam plant and require only a portion of the time of one man to operate. Send for Catalog No. 1242 E. P.

Coal Handling Machinery

and Coal Pockets. We design and build complete plants equipped with machinery of our own manufacture, driven by steam, electricity or gas engines. Send for Catalog No. 1242 C. S.



Fairbanks Scales

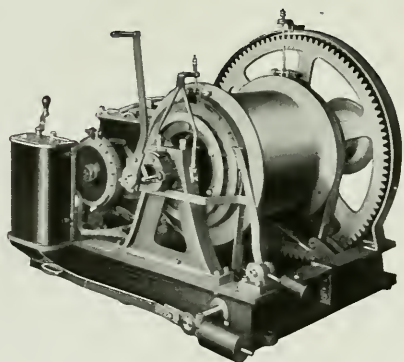
Backed by a reputation for accuracy of nearly 80 years' standing and the largest scale factory in America. They will protect you against financial loss. Made in standard patterns to meet every individual requirement. Send for Catalog No. S. C. 1242.

FAIRBANKS, MORSE & CO., Wabash Avenue and Eldredge Place, Chicago, Ill.

Lidgerwood Electric and Steam Hoists and Derricks

Standard for Builders and Contractors of the World

32,000 STEAM HOISTS AND 1,600 ELECTRIC HOISTS BUILT BY LIDGERWOOD



HIGH SPEED BUILDERS' HOIST

With or Without Solenoid Brake

Hoists 1,500 pounds at 700 to 1,000 ft. per minute. Either A. C. or D. C. Current as desired.

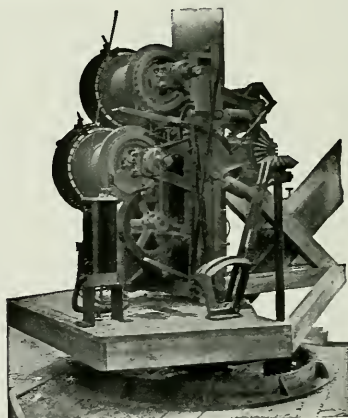
The Special High Speed Electric Builders' Hoist,

shown at the left, has all parts balanced to prevent vibration from rapid running. Used in New York in building Singer Building, City Investing Building, Metropolitan Tower, Fifth Ave. Building and many other skyscrapers.

The Self-Contained, Direct Current Mast Hoist,

shown at right, exclusively used in sinking caissons and all foundation work for Hudson River Terminal Buildings in New York. It is the most convenient and compact form of hoist known.

Lidgerwood Steam and Electric Hoists extensively employed on all large Chicago Buildings.



DOUBLE DRUM ELECTRIC MAST HOIST WITH BOOM SWINGING GEAR

Hoists 4,000 pounds at 130 ft. per minute. swings and handles boom.

LIDGERWOOD MANUFACTURING COMPANY

96 Liberty St., NEW YORK

1917 Fisher Bldg., CHICAGO



What the Western Casket & Undertaking Company Means to the People of Chicago Suburbs and Nearby Towns—

It Means

—that a way has been opened to the people to escape the exorbitant prices charged for caskets, furnishings and services which has been the unquestioned custom for many years and which still exists.

—that instead of being a prey of the undertaker you can select a casket and service at any price you choose because everything is marked in plain figures.

—that a man can buy a casket of exquisite richness at \$15.00 that positively cannot be equaled for less than \$30 to \$50—same per cent of reductions on all grades, which include many rarest woods, lined with the finest silks and satins. We, as manufacturers, know the above figures to be correct and we know that we undersell everyone by a wide margin.

—that Chicago is the first city in the United States to have a large manufacturer of caskets see the light and deal direct with the people.

—that our prices will save the people of Chicago \$3,000,000 yearly, and at the same time furnishing a better quality of caskets and expert services.

—a square deal all around—the rich will not be overcharged—the poor will not be taken advantage of—the fairly well-to-do can buy within their means.

—that we are alone in that we are not bound by any agreement with any association to maintain high prices, we manufacture everything in Chicago by Chicago people.

We have here given you reasons for our low prices and high quality. Those who have bought sacred service can fully appreciate what a revolution we are working in the undertaking business. Those who have not had any experience should bear our principles and purposes in mind.

Western Casket & Undertaking Co.

Central Office: Cor. Michigan Ave. and Randolph St., Chicago
Opposite Public Library

Branch Offices

5216 N. Clark St.
2923 Van Buren St.
1346 W. Madison St.
4029 W. Madison St.
516-518 Wabash Ave.
6359 S. Halsted St.
124 E. 22nd St.
3249 S. State St.

The first and only manufacturers of
caskets and furnishings dealing
direct with the people

Telephone Central 368

Also Offices at
Aurora, Elgin, Joliet, La Salle

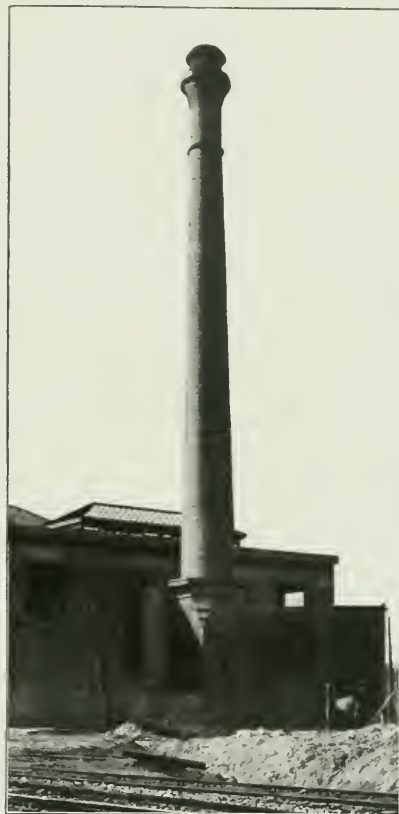
Branch Offices:

11401 Michigan Ave.
3429 Fullerton Ave.
1023 N. California Ave.
534 Grand Ave.
1903 W. Polk St.
1249 N. Clark St.
3462 S. Halsted St.
1463 Blue Island Ave.

The Heine Chimney Co.

Commercial National Bank Building, Chicago, Ill.

Engineers and Builders



Interlocking Radial Brick Chimneys



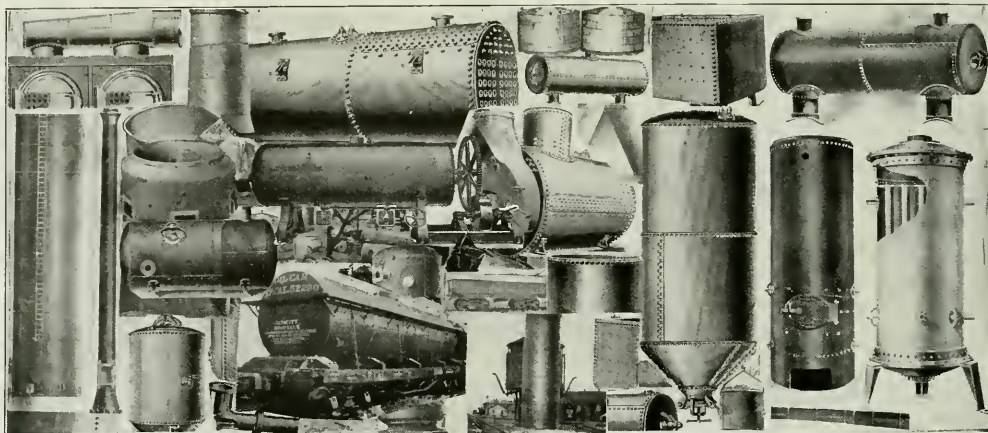
Cost not greater than the cost of old style
common brick construction

The Heine Chimney Co., Chicago, Ill.

HAMLER BOILER & TANK CO.

Office and Works: **Thirty-ninth and Halsted Sts.**

Telephone Yards 947



Agitators
Ammonia Pans
Air Receivers
Asphalt Heaters
All Steel Plate Work
Boiler Pans
Boiler Parts
Boiler Fronts
Boilers, All Types

Breechings
Castings
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Foundry Stoves
Heaters
Jacket Kettles
Locomotive Cabs
Purifiers
Retorts

Smoke Stacks
Smoke Connections
Steel Trucks
Tar Heaters
Tip Buckets
Vats
Water Pipe
Wheel Pits

Ash Tanks
Brewery Tanks
Coal Tanks
Cooler Tanks
Cylinder Tanks
Drain Tanks
Elevator Tanks
Fertilizer Tanks
Freezing Tanks

Gas Tanks
Glucose Tanks
Grain Tanks
Ice Machine Tanks
Lard Tanks
Locomotive Tanks
Oil Storage Tanks
Oil Field Tanks
Rendering Tanks

Roof Tanks
Soap Tanks
Surge Tanks
Sprinkler Tanks
Timber Treating Tanks
Tower Tanks
Water Station
Steel Cars
Tank Cars

Rolling Partitions

Both overhead and side coiling, for separating and subdividing rooms.
Especially adapted for Churches, Schools and Lodge Halls. (See cut.)

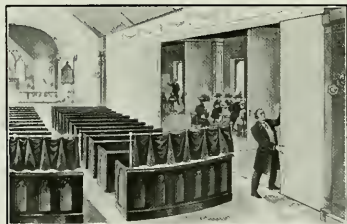
Venetian Blinds for Windows and Porches

Fitting up Sleeping Porches a Specialty

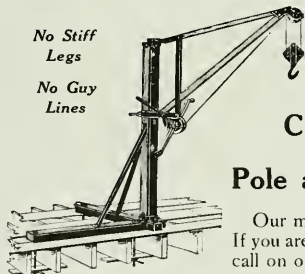
Rolling Steel Shutters, Heavy Slat Rolling Wood Doors and Sliding Swing Doors
for Railroad and Factory Work

H. B. DODGE & CO.

193 Michigan Avenue



No Stiff
Legs
No Guy
Lines



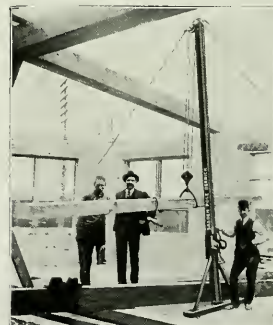
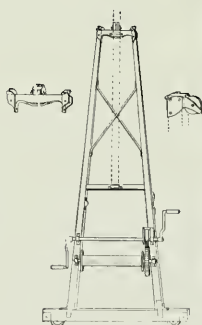
We manufacture nothing but the latest in Builders' Derricks.

CIRCLE SWING
Hand and Horse Power
Pole and Setter Derricks

Our motto is: Satisfaction or no sale.
If you are interested in Builders' Derricks
call on or address,

SASGEN BROTHERS

Main Office and Works: 2053-57 Racine Ave., CHICAGO, ILL.



J. S. HEATH PRES. & TREAS.

A. L. WOODBRIDGE SEC. Y.

Heath-Johnson Company

INCORPORATED 1893

MANUFACTURERS OF

ORNAMENTAL IRON AND BRONZE

IN ALL ITS BRANCHES

REFERENCES

Any leading architect in Chicago.

TERRITORY

We execute contracts in all parts of the United States and Canada.

QUALITY

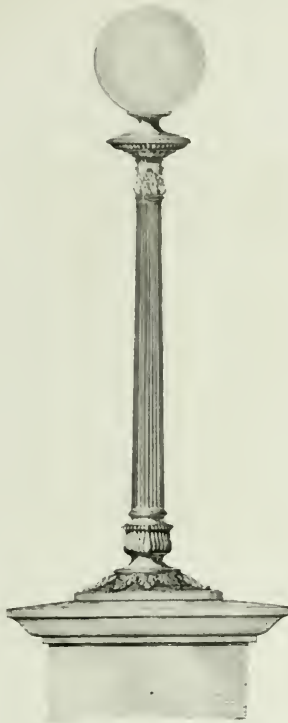
Our work is of the highest grade of workmanship.

ESTIMATES

Furnished upon request.

GENERAL OFFICES AND WORKS
ONTARIO AND FRANKLIN STREETS
CHICAGO

TELEPHONE
DEARBORN 291



T. A. Cummings Foundry Co.

1338-1358 Clybourn Place, Chicago

PHONE LINCOLN 2046

Machinery and General Castings Manhole and Catch Basin Curbs and Covers

Covers for Telephone and Electric Light Conduits for Cities, Towns and Villages
Blow-Off and Gravel Basins Manufacturers of the Chicago Sleeve and Nipple

Standard Architectural Iron Works

Manufacturers of

Structural and Ornamental Iron Work

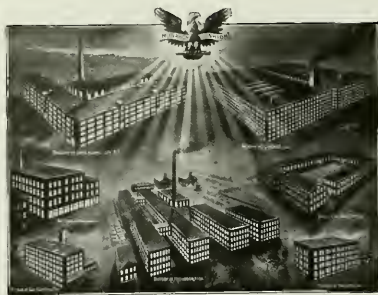
Light and Heavy Grey Iron Castings
of Every Description

for all kinds of buildings

Our Foundry is well equipped for
General Foundry Work

Office and Works: 2300 to 2316 Bloomingdale Avenue, Chicago

Phone Humboldt 1917



We made the best billiard and pool tables in the world when your father was a boy—sixty years ago—and we are still in the lead.

DON'T waste time and money experimenting with a table and equipment of inferior make. It will prove an unprofitable investment.

THE BRUNSWICK-BALKE-COLLENDER CO.

263-265 Wabash Ave., Chicago, Ill.

McCray Refrigerator Co.

Main Office and Factory
151 Lake Street, Kendallville, Ind.

Manufacturers of
The "McCray" Refrigerators

Chicago Office, 55 Wabash Ave.
Telephone Central 3404

Agencies in All Principal Cities

Refer to Telephone Book or City Directory for Address of Local Branch

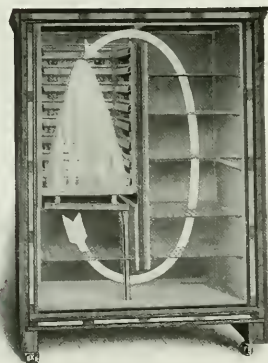


Fig. 1. McCray Refrigerator, with front removed
Arrow shows course of cold, pure air

PRODUCTS—We manufacture the McCray Refrigerators for Residences, Hospitals, Hotels, Restaurants, Cafés, Clubs, Florists Shops, Groceries, Meat Markets, Steamships, Dining-Cars, etc.

Also Cold-Storage Rooms for cooling with ice or refrigerating machinery, and Mortuary Refrigerators for Morgues and Hospitals.

THE MCCRAY GUARANTEE—We guarantee every McCray Refrigerator and Cooling Room to be exactly as represented. If one of our refrigerators or cooling rooms is found to be not as represented, we will gladly refund purchase price and stand all freight charges. This guarantee is binding on us whether refrigerators are bought direct from us or through one of our representatives.

MCCRAY BUILT TO ORDER REFRIGERATORS—A special department is maintained for the planning and manufacturing of built-to-order refrigerators. We have built from our own design under architects' direction and have furnished refrigerators for a large number of the finest residences, hotels, clubs and institutions.

Our service in designing and building refrigerators for particular purposes and to meet special measurement is unexcelled. The refrigerator should be planned for the house, as is the plumbing or heating plant. We have a corps of draftsmen who do nothing but plan built-to-order refrigerator work. On receipt of floor plans, we will prepare detailed plans and specifications for the right refrigerator, its proper location and outside icing door, free of all charge. It generally is a distinct saving to plan the refrigerator before the building is started.

Write for book "McCray Refrigerators in American Homes" which shows McCray Built-to-order Refrigerators in 19 recent American Homes of the better class, and for any of the following catalogs that interest you:

Catalog No. 87, Regular Size Refrigerators for Residences; No. 67, for Groceries; No. 59, for Meat Markets; No. 48, for Hotels, Clubs and Institutions; No. 72, for Flower Shops.

Complete Catalogs and prices furnished on request, or may be seen by reference to pages 1104-1107 of the 1910 Sweet's Index

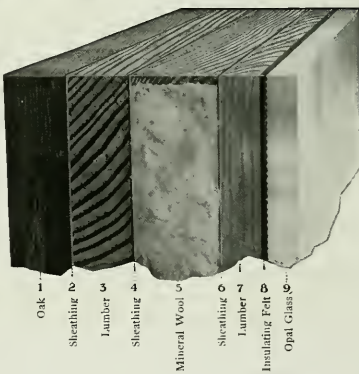
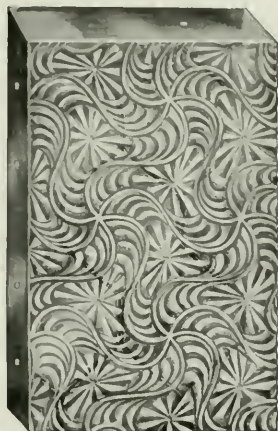


Fig. 2. Wall of Glass-Lined McCray Refrigerator
One-half actual size

Chicago Office,
72 Madison Street

St. Louis Office,
Main and Angelica Sts.



MAZE "WIRE GLASS"



The Approved Fire Retardant

Specify
MISSISSIPPI WIRE GLASS
and insist upon having it.

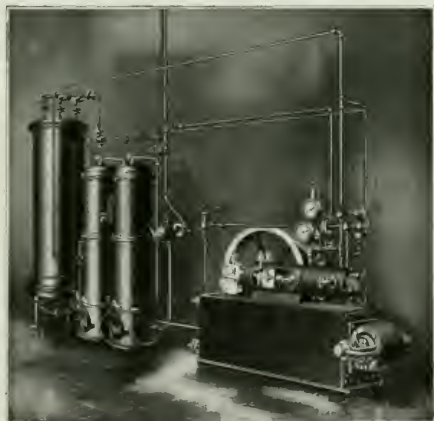
The material upon which the standard is based.



POLISHED "WIRE GLASS"

Made in four styles, namely: Rough, Ribbed, Maze and Polished.

USE FOR SKYLIGHTS, WINDOWS, STAIR AND ELEVATOR ENCLOSURES, DOORS, TRANSOMS, PARTITIONS AND IN FACT ANY PLACE WHERE FIRE AND BREAKAGE PROTECTION ARE REQUIRED.



Water Cooling Plant in the Printers' Building

Our handsome catalog will be sent to any interested party, upon receipt of request mentioning the class of service to which the machine is to be put.

The Creamery Package Mfg. Company

Ice Machine Department

61-67 West Kinzie Street Chicago

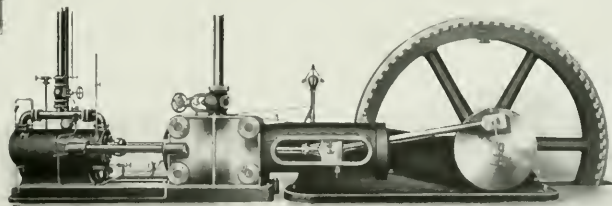
Refrigerating and Ice Making Machinery

We build refrigerating and ice making machinery in all capacities and for every purpose.

We have been especially successful in the equipment furnished hotels, restaurants, department stores, hospitals, office buildings, though our list of users numbering upward of 1500 includes practically every service for which refrigeration is employed.

Our machines are of the ammonia compression type. They are built of highest grade material, properly proportioned in all parts, and are most easily cared for.

We also make a full line of ammonia fittings of superior quality.



Refrigerating Machine Tandem-Connected to Corliss Engine as installed in the Palmer House

HILGER & COMPANY

FACTORY

2504-2512 South Robey St.

OFFICE

237 Michigan Avenue

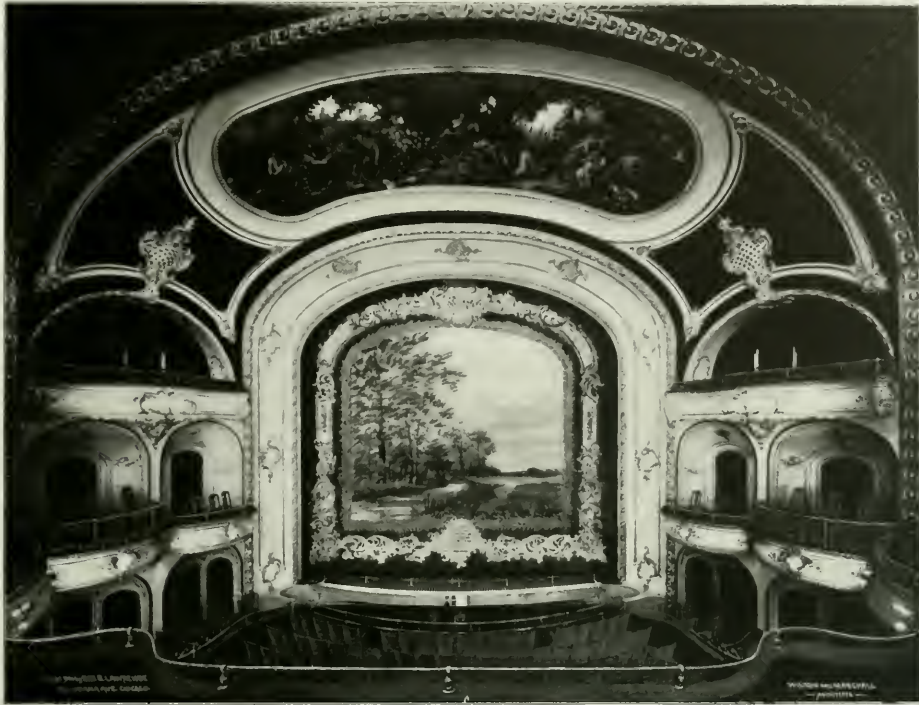
TELEPHONES

Harrison 6307 and 3715
Canal 3512

BUILDERS AND CONTRACTORS

**ARCHITECTURAL
WOODWORKERS**

DESIGNERS AND FURNISHERS



OPERA CHAIRS FURNISHED BY AMERICAN SEATING COMPANY, ILLINOIS THEATRE, CHICAGO. B. H. MARSHALL, Architect.

THE AMERICAN SEATING COMPANY, manufacturers of a varied line of opera chairs, church furniture, school desks, teachers' desks, chairs and tables, recitation room chairs, maps, globes, blackboards and school supplies of all kinds.

We are prepared to furnish stock designs promptly on receipt of order.

This COMPANY has four complete and modern plants equipped with the latest improved and up-to-date machinery and is in a position to execute contracts from the smallest to the most stupendous with promptness and satisfaction.

Our factories are centrally located and have unexcelled facilities for shipping both by rail and water.

This COMPANY will gladly furnish estimates upon receipt of specifications and will submit special or stock designs upon request.

American Seating Company

Salesrooms

CHICAGO
NEW YORK
BOSTON
PHILADELPHIA



Factories

RACINE, WIS.
MANITOWOC, WIS.
GRAND RAPIDS, MICH.
BUFFALO, N. Y.

Established 1873

PHONES { Main 1894
Austin 1302



J. DUNFEE & CO.

104 Franklin St., Chicago

Hardwood and Parquetry Floors

of all Descriptions

Hard Wax Polish

Excelsior Floor Finish

Floor Finishing Our Specialty

SPECIAL DISCOUNT TO REAL ESTATE AGENTS

It is almost needless to mention the advantages of Hardwood Floors over the health destroying, moth-breeding and uncleanly carpets in the residence.

They have come to be considered indispensable to the well-regulated household, not only in homes of the wealthy, but where economy is to be taken into account; the cost of repeated renewals of carpet, which is continually wearing out, being no small item in the course of a few years.

The Parquetry Floors will last for generations, and the expense of keeping them polished is probably less than removing and cleaning the ordinary carpet.

Especially do physicians recommend these floors from a sanitary point of view.

Upon your request, we will be pleased to send catalogue.

Warerooms:
Indiana Avenue & 16th Street

THE FORD & JOHNSON CO.

Salesrooms:
1433-1437 Wabash Avenue

- PRODUCTS.** Manufacturers of CHAIRS and FURNITURE for Hotels, Clubs, Libraries, Offices, Court Houses, Museums, Railroad Stations, and all classes of Public and Private Buildings.
- DESCRIPTION.** This Company was originally established over fifty years ago and has grown from a small plant at Michigan City, Ind., into an organization with a capital of \$3,000,000, owning and operating twelve factories throughout the United States, devoted to the manufacture of chairs and furniture.
- SERVICE.** This Company has one of the best equipped plants in the country and is fitted with the most improved and up-to-date machinery, and by reason of its large capacity and resources, is prepared to execute contracts for furnishing any kind of public building in the shortest possible time.
- ADVANTAGES.** This Company has its own force of designers and draftsmen, and special designs will be furnished promptly upon application. In addition to a large and comprehensive line of stock patterns, it has unusual facilities for the manufacture of specially designed furniture of any Period style in domestic or foreign woods.
- ESTIMATES.** Estimates furnished upon architects' specifications.

HENRY BOSCH COMPANY

Decorative Material

IN

Paper Hangings, Textiles, Relief

338 Wabash Ave. 344

CHICAGO

NEW YORK

Established 1872



THE CELEBRATED LINE OF
Karpen Guaranteed Upholstered Furniture

Recognized as **THE STANDARD** everywhere
For Sale by First Class Furniture Dealers

Upholstered furniture for every conceivable use, in both fabric and leather upholstery.
Estimates gladly furnished on furniture to be built for special purposes, either according
to architect's plans, or from drawings of our own designers.
Furniture for lodge rooms and public buildings of all kinds a specialty.

S. KARPEN & BROS.

CHICAGO
187-188 Michigan Ave.

BOSTON
22-26 Sudbury St.

NEW YORK
155-157 W. 34th St.

The Sanitary Seamless Stone Blackboard
FOR MODERN SCHOOLS

Ground Slate, Steel and Cement, applied with a trowel
on a base-coat of hard plaster makes a

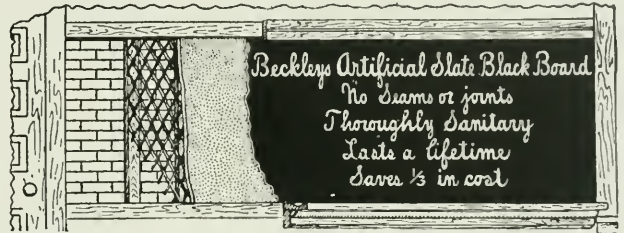
Solid Concrete Slate Surface

without seam or joint, lasts as long as the building, is
fire proof — is not injured by washing and is

THOROUGHLY CLEAN AND SANITARY

Fifty thousand square feet of blackboard furnished for Chicago schools.

M. H. E. BECKLEY Manufacturer and Sole Owner
80-82 Wabash Ave., Chicago
School Furniture and Supplies of all kinds.



Reinforced Concrete
Pressed Brick
Stone Facings

FACTORY OF THE
Pelouze Scale & Mfg. Co.
232-242 E. Ohio Street

F. P. ARMBRUSTER
1st Vice Pres.

This building contains 175,000 square feet of floor space

J. H. BULLY & WARELL CO. LTD.

J. H. BULLY & WARELL CO.

ENGLISH - EARTHENWARE

FRENCH & GERMAN CHINA

LAMP - GLASSWARE

CHINA BRILLIANT CUT GLASS

J. H. BULLY & WARELL CO. LTD.

A black and white photograph of a multi-story building facade. The building features a series of large, arched windows on the upper floors, each divided into multiple panes. The ground floor has a central entrance with a small awning and is flanked by large display windows. A sign above the entrance reads "H. J. W. & CO. BUILDING". The building is surrounded by a street with a sidewalk and a few trees in the background.

385 to 389 Jackson Street
ST. PAUL

Soda Fountains, Store and Bank Fixtures

The L. A. Becker Company of Chicago is conceded to be the largest exclusive soda fountain factory in the world. It builds complete in one factory absolutely everything that enters into the construction of a soda fountain except mirrors.

Among the notable installations of soda fountains built by this company may be mentioned that of

John Wanamaker, New York.
Terminal Station, Washington, D. C.
Terminal Station, Philadelphia.
McAdoo Terminal Station, New York.
William B. Riker & Son Co. (9), New York.
Hegeman & Company (5), New York.
The Great Boston Store, Chicago.
Judge & Dolph Drug Company, St. Louis, Mo.
Busy Bee Candy Company, St. Louis, Mo.
The Famous Department Store, St. Louis, Mo.
Denver Dry Goods Company, Denver, Colo.
Owl Drug Company, San Francisco.
The Nunnally Company, Atlanta, Birmingham, and Chattanooga, and many others.

Our Service We are prepared to design, build, and install high grade soda water apparatus of any style or description. We will submit to architects or builders complete designs, specifications, and estimates upon request. We build strictly to order high grade drug, confectionery, and bank fixtures, either upon architects' designs and specifications or upon designs and specifications furnished by us.

Correspondence solicited from architects and builders.

L. A. BECKER COMPANY
CHICAGO

Chicago Oyster Pail Co.

JOSEPH J. LANZIT, President

Green and Congress Streets, CHICAGO

We
Manufacture

Paper
Oyster
Pails

Paper
Ice Cream
Pails



FREDERICK R. LANZIT and CHARLES D. LANZIT
"LET'S GO FISHING, BROTHER"

We
Manufacture

Paper
Cake
Boxes

and

Candy
Boxes

We Manufacture

Corrugated Paper Shipping Cases

Established 1857

ALBERT PICK & COMPANY
CHICAGO



Our sales have multiplied TWELVE times in TEN years.

Why not let us do your Advertising?

Don't let a false sense of dignity interfere with business getting. The highest grade advertisers in the country use posters, even if billposting is the biggest and most sensational advertising known.

**American
Posting
Service**

757 W. JACKSON BOULEVARD
Telephone Monroe 1963

BILLPOSTERS AND DISTRIBUTORS

A HALF CENTURY OF CHICAGO BUILDING

St. Louis, Mo.
New York

Kansas City, Mo.
Milwaukee

Omaha, Neb.
Louisville

Buffalo, N. Y.
Rochester

Cincinnati, O.
Indianapolis, Ind.

ESTABLISHED 1875

Thos. Cusack Company

Out-Door Advertising

Executive Offices, 15th and Throop Streets : : Chicago



GENERAL OFFICES, CHICAGO, ILL.

PAINTED bulletins, walls, and electrical spectacular advertising signs in the large cities.

PAINTED wall advertising signs in the smaller cities and towns.

PAINTED railroad field bulletins along any stretch of railway.

COMMERCIAL signs of all kinds.

OUR ORGANIZATION and facilities are greater than those of any other out-door advertising concern in the world.

WRITE US for rates on painted sign publicity in any city, state or territory.

Painted Display Sign Advertising Anywhere

**COMMERCIAL
SIGNS
OF EVERY DESCRIPTION
ELECTRIC
SPOT-LIGHTED
WALL AND BULLETIN
ADVERTISING**

TAGNEY & HUDSON CO.
2644 Sheffield Avenue
PHONE 2080
LINCOLN
CHICAGO, U. S. A.

M. ESPERT, President and General Manager

FRED. ESPERT, Secretary and Treasurer

Monarch Refrigerating Co.

Incorporated 1894

Cold Storage

Freezing a Specialty

Michigan, Rush, Cass and Kinzie Streets :: :: CHICAGO, ILL.

A HALF CENTURY OF CHICAGO BUILDING

Montgomery Ward & Co.

Chicago and Kansas City

ESTABLISHED 1872



Madison Street and Michigan Avenue



Reinforced Concrete Building, 19 Million Cubic Feet. Chicago Avenue Bridge

ORIGINATORS OF THE CATALOGUE BUSINESS

A HALF CENTURY OF CHICAGO BUILDING

In 1852 Mr. John V. Farwell, Sr., became a member of the firm of Cooley, Wadsworth & Company, the first and leading wholesale dry goods house of Chicago, the name then being changed to Cooley, Farwell & Company. The first building of the company erected in 1857 was located at 42-44-46 Wabash Ave. After the great fire of October, 1871, the firm occupied temporary quarters on Michigan Avenue about No. 167. The business later was removed to Monroe Street. In 1882 the firm moved into its present quarters. In 1892 the business was incorporated as the John V. Farwell Company, under which title it is now doing business. The house of Farwell stands today as one of the great leaders of trade in the country. Its voluminous stocks are constantly kept at the highest point of efficiency. Its buyers import direct and contract for the entire output of mills and avail themselves of every opportunity offered by the markets of the world.

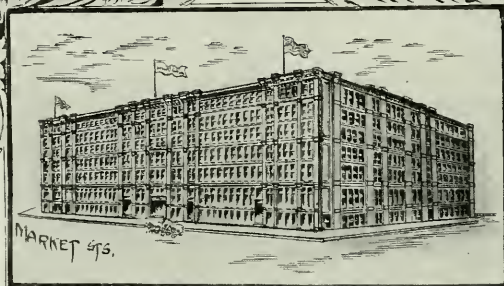
FIRST BUILDING, 42, 44, 46 WABASH AVE.



TEMPORARY QUARTERS AFTER THE FIRE.



PRESENT QUARTERS. MONROE AND MARKET STS.



JOHN V. FARWELL COMPANY
MANUFACTURERS,
IMPORTERS,
CONVERTERS, WHOLESALE
CHICAGO.



STATE, MADISON
AND WABASH

CARSON PIRIE SCOTT & Co.

CHICAGO,
ILL.



1875



1878



1890



1885



1897

Established 1875
by
E. J. LEHMANN

THE FAIR

STATE, ADAMS AND
DEARBORN STREETS
TEL. PRIVATE EX. 3

The growth of The Fair, as typified in the series of buildings occupied since its establishment by E. J. Lehmann in 1875 on its present site, has been always in advance of the city's growth in population — The Fair is now, as it has been for years, Chicago's great central retail market for everything for **ALL THE PEOPLE.**

A Store
for Men's,
Women's and
Children's

Clothing,
Cloaks
and
Suits,
Furnishings,
Underwear,
Hats and Caps,
Shoes,
Gloves.

Drugs
and
Medicines,
Toilet
Articles,

Sporting
Goods,

Trunks
and
Bags,
Dry Goods.



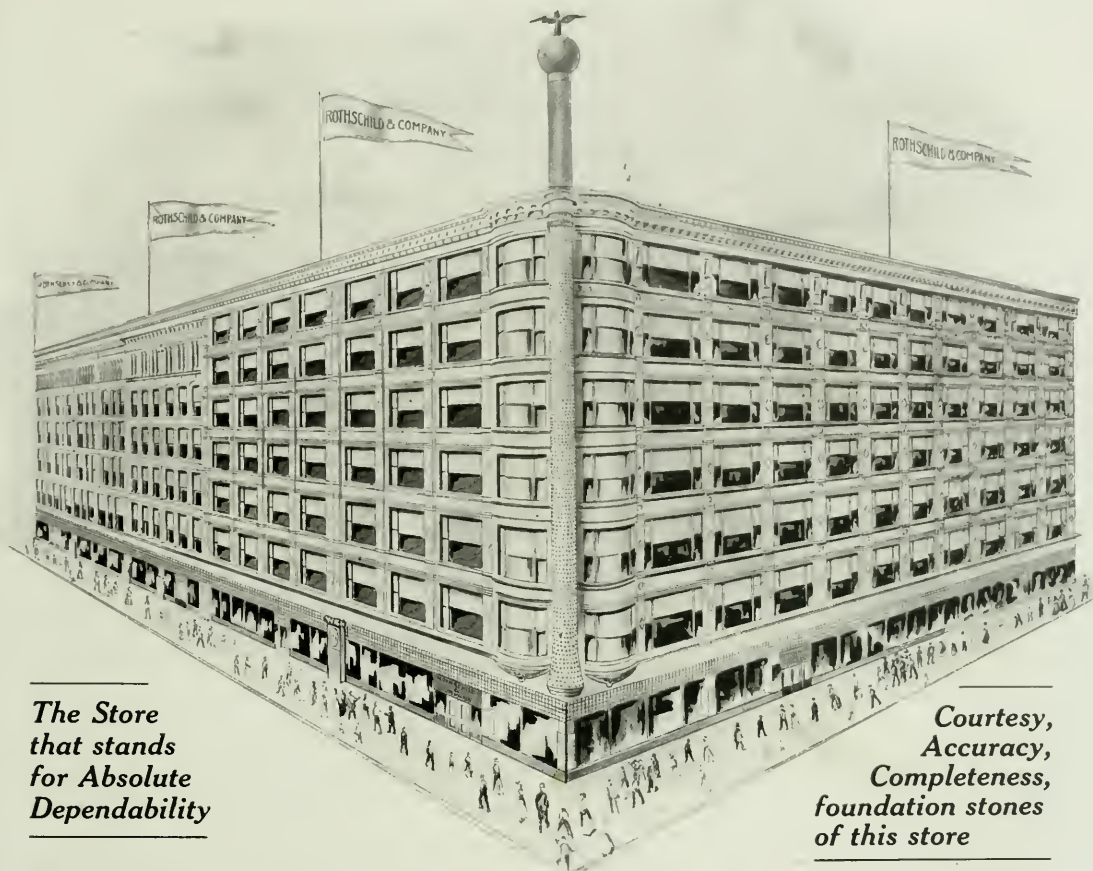
A Home
Furnishing
Establishment.

Groceries,
Meats
and
Fish,
Household
Hardware
and
Kitchen
Supplies,
Carpets
and
Rugs,
Curtains
and
Draperies,
Furniture
of all
Kinds,
Stoves
and
Ranges,
Lighting
Fixtures.

1909



BOSTON STORE, State, Madison and Dearborn Streets.



*The Store
that stands
for Absolute
Dependability*

*Courtesy,
Accuracy,
Completeness,
foundation stones
of this store*

Rothschild's a Store of Progress

Progress in every direction. Rapid, continuous increase of business, improvement of methods and details of organization, quickly adopting new ideas and installing new devices which have proved practical—constantly aiming to do business better and to be of greater service to the public, each year, each season, each day.

That this store is the center of supply for thousands of Chicago families is best evidenced by the fact that this immense block is inadequate to the fulfillment of our ideals; such is our progress that this great building is now only temporary.

The Home
of the
Famous
Meister
Piano

Rothschild & Company

All El. Trains
Stop Here.
Direct Bridge
Entrance

State and Van Buren Streets and Wabash Avenue

"Northwest Side's Popular Shopping Center"



We occupy

**$\frac{1}{4}$ Million Square Feet
of Floor Space**

and are recognized as Northwest Side's Largest Shopping Center. We carry complete Stocks in all lines of General Merchandise. Our Grocery and Provision Departments have been the source of supply to thousands of homes. The great popularity of this Wonder Store has been achieved by adhering to the policy of giving our patrons, the very highest quality for the least possible cost.

WIEBOLDT'S

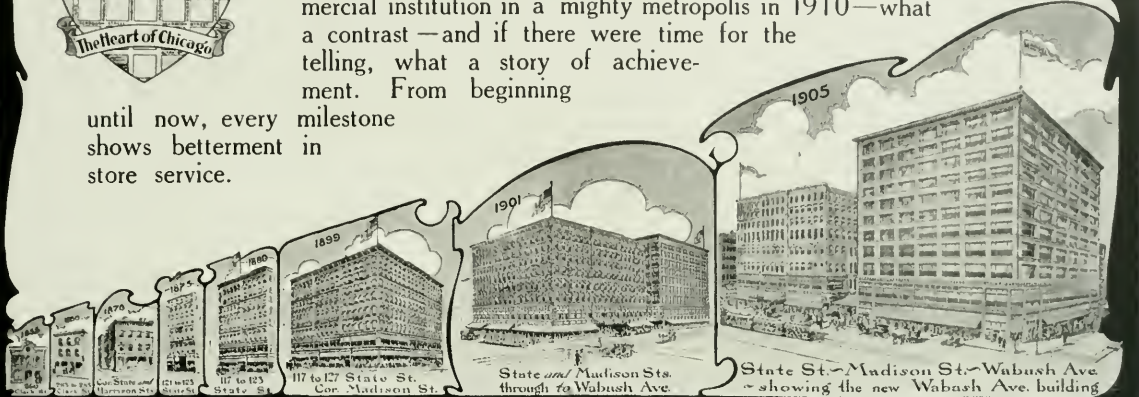
MILWAUKEE AVENUE AND PAULINA STREET.

For 55 years the house of Mandel Brothers has been prominent in the heart of Chicago



until now, every milestone shows betterment in store service.

The parallel in the development of Mandel Brothers as a store and Chicago as a city is strikingly illustrated by the accompanying pictures which show a wonderful advance from a small beginning. An ordinary store in a small town in 1855—a great commercial institution in a mighty metropolis in 1910—what a contrast—and if there were time for the telling, what a story of achievement. From beginning



CHAS. A. STEVENS & BROS

Women's Outfitters, State Street, Chicago

STYLES

Have played an important part in the building of this great city.

You may not realize it, but it is a fact that a great majority of the women who visit Chicago every year come to see the new styles and purchase wearing apparel. The people of the West, the South, the North and from a large section of the country to the East now recognize Chicago as a fashion center. Incidentally we might add that this firm has done more than any other towards establishing this reputation, being known throughout the entire country as the largest and highest class exclusively outfitting store for women and children in the United States.





OUR BEGINNING 1887
S. E. COR. STATE AND
ADAMS STS.

SIEGEL COOPER & CO'S WAREHOUSE
16TH & STATE STS, CHICAGO.



SIEGEL COOPER & CO'S PRESENT STORE.
STATE, VAN BUREN AND CONGRESS STREETS, CHICAGO.



THE SIEGEL CHAIN OF STORES
THE SMALL STORE ILLUSTRATED IN THE LEFT UPPER CORNER
WAS THE ORIGINAL OF THE GREAT SIEGEL CHAIN OF FOUR STORES
NOW COMPRISING.

SIEGEL COOPER & CO. CHICAGO, 14TH STREET STORE, NEW YORK.
SIMPSON CRAWFORD CO. NEW YORK. HENRY SIEGEL CO. BOSTON.



General Offices and
Wholesale Department
330 - 352 East Ohio St.

A. C. McCLURG & CO., CHICAGO

SALES ROOMS
Wholesale and Retail
215-221 Wabash Ave.

A. C. McCLURG & CO.

Books, Stationery
and Fancy Goods

WITH the completion of our
new Wholesale buildings on
Ohio and Ontario Streets, Chicago,
together with our long established
retail business at 215-221 Wabash
Ave., we now have the largest establish-
ment of its kind in this country.

Our total floor space of 200,000 square feet in
these two wholesale buildings makes it possible
to carry, at all times, practically complete stocks
of Stationery, Tablets, Blank Books, Fancy
Goods, Leather Goods, Typewriter Papers and
Holders, Desks and Office Chairs, Book Cases,
Show Cases, Druggists' Sundries, Toilet Articles
and Perfumery, Pocket Cutlery, Pipes, Diaries,
Traveling Bags, Suit Cases, Pyrography Goods,
Holiday Goods, China, Cut Glass, Sterling Silver,
Watches, Toys, Dolls, Musical Instruments, etc.

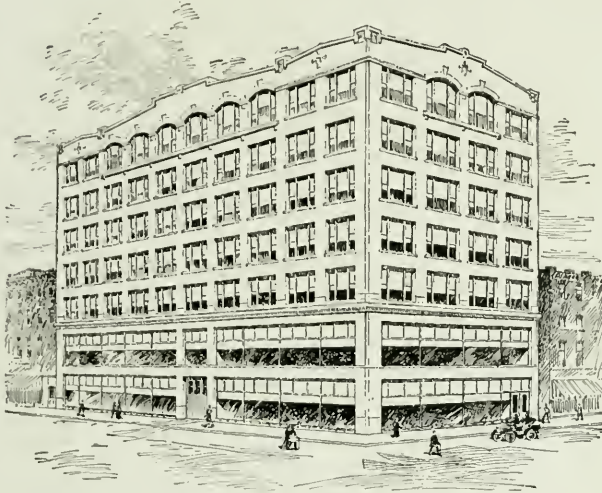
With such an equipment, and such stock, this
firm is in a position to fill orders promptly, com-
pletely, and with salable goods. It is also a
great advantage for customers to buy all these
different lines from one establishment.

In order to maintain a downtown representa-
tion the firm has established the most complete
sample rooms and sales rooms at 215-221 Wabash
Avenue. Samples of their regular lines are con-
stantly on exhibition, and the trade will find it
preferable to call there than over at the North
Side buildings.

Studebaker

Home Office and Factories at South Bend, Indiana

BRANCHES IN PRINCIPAL CITIES

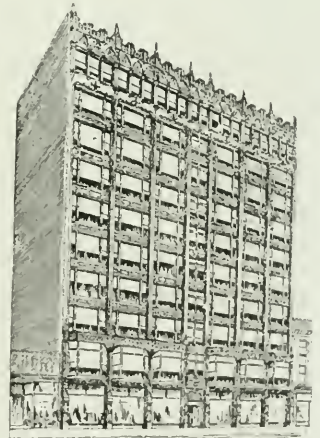


Studebaker Automobile Building, Michigan Boulevard and Twenty-first Street.
Occupied exclusively by the Automobile Department of the
Chicago Studebaker Branch.

The remarkable policies of the STUDEBAKER Company have endeared it to every country under the sun, for quality has had—and always will have—first consideration. The name of STUDEBAKER has never been smirched with inferiority in even the smallest detail, and it stands today as a model of high class business integrity and ability.

Its harness factory is easily the largest in the world. The Chicago Branch of STUDEBAKER, established in 1874, at all times carries a complete line of HORSE VEHICLES, ELECTRIC and GASOLINE AUTOMOBILES, TRUCKS, HARNESS, SADDLES, and all accessories. STUDEBAKER vehicles are the vogue throughout the aristocratic world, and wherever the name appears it stands for Good Form, Quality, Class and Refinement in every sense of the terms.

The prestige of the name STUDEBAKER extends to every quarter of the globe, and wherever civilization has reared its head STUDEBAKER vehicles are in daily use, and have been since 1852. During that year the Factory was established in South Bend, in a little one room structure, and its success was phenomenal from the very beginning. Today it occupies 101 acres of territory and employs over 4,000 men, all skilled in their various vocations. The STUDEBAKER concern is the largest manufacturer of vehicles in the world, and its product embraces all manner of horse drawn vehicles, from the stout farm wagon to the smart city stanhope, and of late years it has added motor cars, with tremendous factories at Elyria, Ohio, and Detroit, Michigan.



Studebaker Building, 378-388 Wabash Ave.
Occupied by the Carriage, Wagon
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Chicago Studebaker Branch.

Studebaker Bros. Mfg. Co.

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This beautiful structure emphasizes the great and growing popularity of the Locomobile and testifies to the successful growth of the Locomobile Organization in Chicago since its establishment ten years ago.



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THE SEFTON MFG. CO. "BOX OUTFITTERS" CHICAGO PLANT

MAKERS OF

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**Corrugated Paper and
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Corrugated Strawboard and 3-Ply Fibreboard—
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Prices and Samples on Application



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Factories: Chicago, Illinois, and Anderson, Indiana



Building a Quality Reputation



THE trained producer who strives constantly to improve and increase his output, who keeps up to date on the best methods and discoveries in his line, who has an ideal to work for, can be depended upon to satisfy buyers of that product who know the best and want it.

In this way the reputation of Swift's Premium Products has been built. For twenty-five years a standard of quality, closely approaching the ideal, has been maintained. During all this time some new method of improving the quality of Premium goods was being sought or applied.

The inevitable reward of twenty-five years of continuous, progressive, constructive effort is that

Swift's Premium Hams & Bacon

and other Premium products are recognized everywhere as the highest grade produced. Their reputation for quality is firmly built in the minds of the American public.

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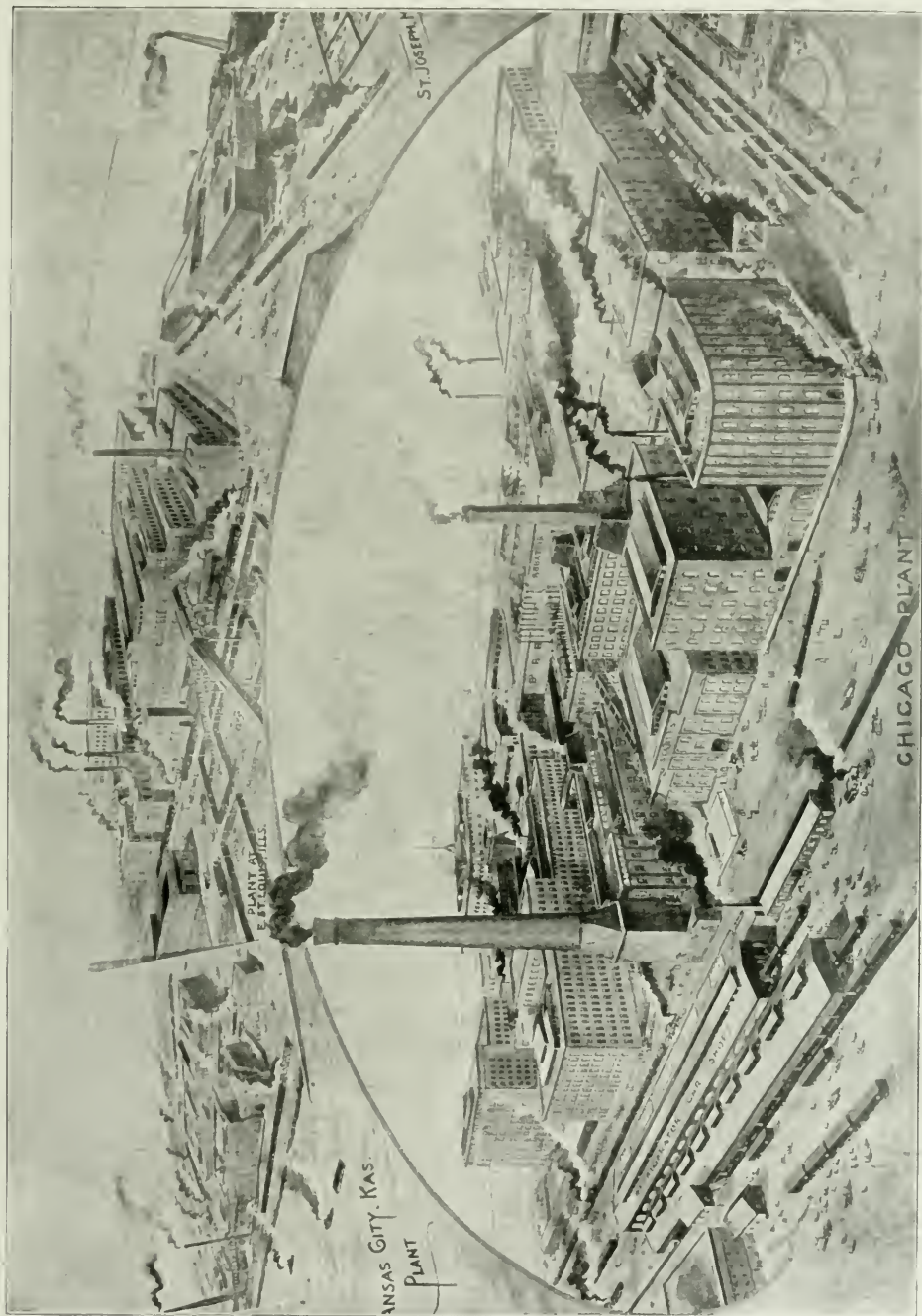
CHICAGO, ILLINOIS



Birdseye View of Armour's, Union Stock Yards, Chicago. The Largest Packing Plant in the World
Photographed from a balloon at an elevation of several hundred feet



Armour & Company, New General Office Building, Union Stock Yards, Chicago. Completed May 1, 1908
The largest building used exclusively for office purposes by one concern only, in the world



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Ham, Bacon, Lard
Canned Meats, Sausage, etc.

MORRIS & COMPANY

PACKERS AND PROVISIONERS

The Independent Packing Co.

PATRICK BRENNAN, Pres.

41st and Halsted Streets



Modern Packing Plant

Daily Capacity, 500 Cattle

“ “ 2,000 Hogs

“ “ 500 Sheep

Beef,
Pork and
Mutton

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CHICAGO

Packing House and Office:
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U. S. GOVERNMENT INSPECTION ABATTOIR 169



"The House of Quality"

Our goods give satisfaction
Our product will increase your trade

Our facilities are the best
Our trade is growing

"There's a Reason"

"Perfect Product"

"Faultless Flavor"



THE HOME OF THE GOLD DUST TWINS



Oval Brand

Black Diamond Brand

A Half Century of Building of the Fish and Oyster Business
Guarantees to Millions of Satisfied Consumers
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ABSOLUTELY THE BEST

Fresh Fish, Oysters and Sea Foods

Produced from the Great Lakes, Rivers and Sea Coasts of North America

Ask for Booth *Black Diamond* Canned Salmon, Sardines,
Lobster, Shrimp, etc. — *The Brand of Excellence.*

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Most Modern Facilities for Storage of Perishable and Other Merchandise
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built in Chicago



Seventy years
of
Successful
Soap Making

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39th and Butler Streets Chicago

Pork Packers

Manufacturers of *Cured Meats* and *Prime Steam Lard*
Choicest Quality

JOHN W. ECKART & CO.

311 N. CARPENTER STREET



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CAPACITY 25000
BARRELS DAILY

B. A. ECKHART, Proprietor

Capacity 3600 barrels per day

B. A. Eckhart Milling Co.

Merchant Millers

1300 to 1332 Carroll Avenue, from Elizabeth St. to Ada St.

Our new 3600 barrel Mills are now in full operation, producing the finest grades of Spring and Winter flour made in the world. The only mills in the United States arranged with complete and improved Hungarian Sifter System.

B. A. Eckhart's "XXXX Best" PATENT

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Hyde Park Boulevard and the Lake Shore

Chicago's most delightful residential and transient hotel, situated in eleven acres of private grounds, away from the noise and dirt of the city, yet within ten minutes of the loop by means of the Illinois Central suburban service.

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RICHARD M. GRAY Manager

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(On site of old Sherman House)

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Chicago's latest
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757 Rooms—
Every room with
bath and circulat-
ing ice water.

*Three very attract-
ive restaurants—*

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being the most beautiful grill room in America.

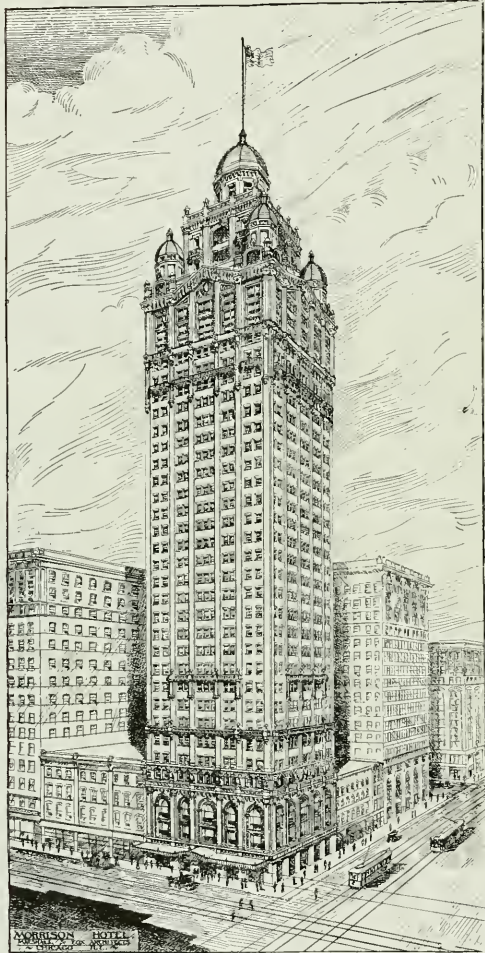
HOTEL SHERMAN COMPANY

Joseph Beifeld, President

HOTEL MORRISON

—AND—

BOSTON OYSTER HOUSE



C · H · I · C · A · G · O

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HARRY C. MOIR, PROPRIETOR AND MANAGER

The Most Centrally Located and Popular Hotel and Restaurant in the
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☐ HOTEL MORRISON is today one of Chicago's most popular hotels. It contains 350 modern, tastily furnished, clean and well ventilated rooms.

Rooms with Bath, \$1.50 and up || Operated on the
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☐ In connection with the hotel is our restaurant of national reputation, THE BOSTON OYSTER HOUSE, with a seating capacity of over 1200 people.

☐ This restaurant is widely known for its reasonable charges and for the best in the land there is to eat and drink.

☐ At its tables each day are seated men of national and local renown in the commercial, political and sporting world.

Among the various Clubs who eat here are the Foresters' Club, Illinois University Club, Wiggins Club, Sox Club, 1st Club, Wells-Fargo Club, Shamrock Club, Skidoo Club, Ben Franklin Club, Dennison Club, N. W. Republican Club, Chicago Aldermen's Club, Commissioners' Club, Building Commissioners' Club and various groupings of different Religious, Fraternal and Social Societies.

☐ During all meals our patrons can enjoy high-class musical renditions furnished by the ladies' orchestra in the main dining room or the organ recitals in the beautiful mural dining room.

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Plans prepared by Marshall & Fox, Architects

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HARRY C. MOIR, Proprietor and Manager

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750 Rooms Every room has electric light and telephone service.
Thoroughly modern and up to date.

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Conducted on the good old American plan. 400 rooms, all with private bath, and all other modern improvements. A desirable home for refined families. :: :: :: European plan if desired.



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The most extensive, commodious and costly structures ever erected for hotel purposes, in which are included Banquet Rooms, with accommodations for from ten to six hundred persons; Ladies' and Gentlemen's Restaurants; Palm Garden; New Breakfast Room; Private Dining Rooms; Japanese Tea Room; Elizabethan Room; the magnificent Pompeiian Room, etc., etc., all facing Lake Michigan and Grant Park.

A magnificent new Convention Hall, seating five hundred people, has just been completed. Special attention was given in this room to the acoustic properties, ventilation, accessibility and quietness.

R. H. SOUTHGATE, President.



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(New) *SOUTHERN HOTEL* Chicago

Complete in Appointment

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Absolutely Fireproof



300 Rooms

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Circulating Ice Water

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C. H. SHAW,
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33rd Street, Cottage Grove
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320 Rooms—
200 Private Baths

Absolutely Fire Proof

Twenty minutes from the
Business Center. Wabash
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Avenue Car Line Direct.

All trains on Illinois Cen-
tral, Michigan Central and
Big Four Railroads stop at
31st St. Station, two blocks
from Hotel.

Telephone in every room.

*Especially Reasonable
Permanent and
Transient Rates*

Clean, Quiet, Convenient

Telephone Douglas 673

HARRY HILDRETH
Proprietor



HOTEL WARNER

*European Plan
Fire Proof*

320 Rooms
200 Private Baths

Rooms
with private bath
\$1.00 to \$1.50
per day

2 and 3 Room Suites
with bath
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per day

*Special Permanent and
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Cafe Service
Includes Special Breakfasts at
20 to 50 cents
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in addition to the regular
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Grill 8 p. m. and 1 a. m.



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(New) SOUTHERN HOTEL Chicago

Complete in Appointment

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300 Rooms

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33rd Street, Cottage Grove
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Permanent and
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320 Rooms
200 Private Baths

Room
with private bath
\$1.00 to
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2 and 3 Rooms
with private bath
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Special Permanent
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CAFE
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Cafe Ser-
Includes Special
20 to 50
and
Table d'hôte Dinner
in addition to the
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Grill 8 p. m. and later



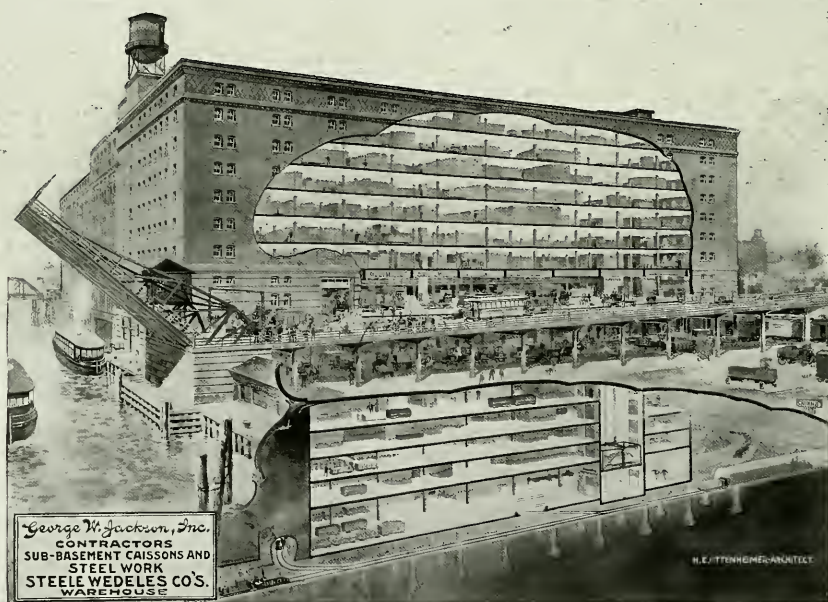
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UNEXCELLED CUISINE — SUPERIOR SERVICE

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*The Place to Eat where Quality
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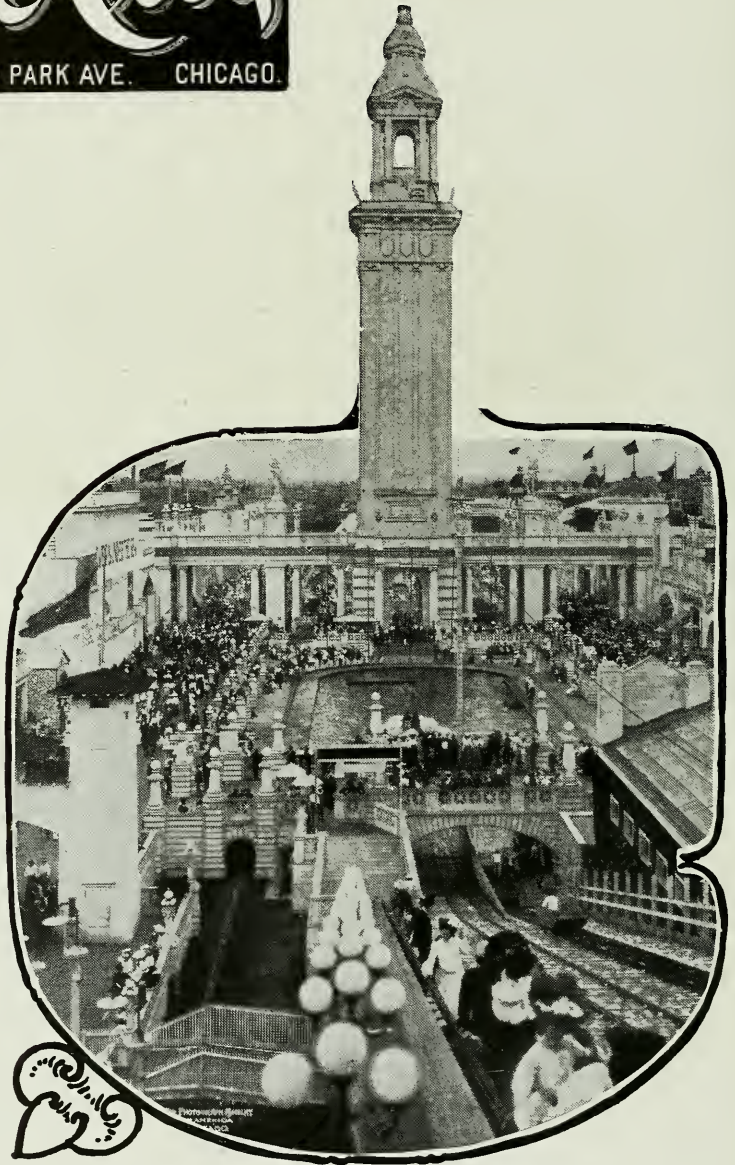
this scene
is one of the

Most
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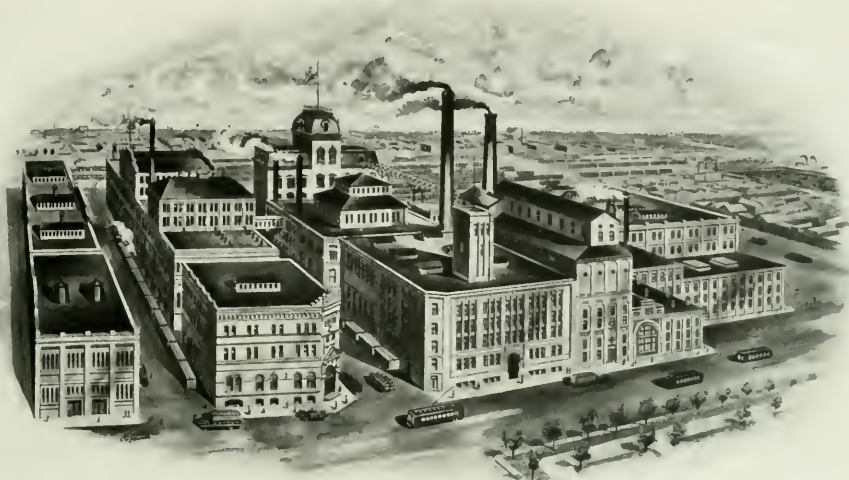
Soul
Inspiring
and

Dazzling
Sights

on the
American
Continent



The Peter Schoenhofen Brewing Company



Plant of The Peter Schoenhofen Brewing Company

- ¶ The above engraving represents the result of fifty years' constant striving to furnish the public with the best beverage possible.
- ¶ The Peter Schoenhofen Brewing Company was founded by Mr. Schoenhofen in 1860, with an output of less than 600 barrels per annum. From this insignificant beginning the concern has become one of the largest breweries in the world, with a capacity of over 1,500,000 barrels of keg beer, and 50,000,000 bottles of bottled beer per annum.
- ¶ The Company does an immense country business, and during the summer handles 60 cars of beer in one day.
- ¶ The product of the Company, "Edelweiss," is known throughout the United States for its purity and flavor, and is the standard of comparison for every brewery which attains to perfection.
- ¶ Edelweiss Beer was awarded a prize at the Paris Exposition in 1900, and first prize at the World's Pure Food Exposition, which was held in Chicago in the fall of 1907.

Riverview Exposition



IN 1879 a company of Germans, members of the Krieger Verein, organized a pleasure club with the object and purpose, as expressed, of "improving rifle practice among its members"; they were members of the Sharpshooters corps in the German army. They secured what is now the central portion of the Riverview Exposition and named it Sharpshooters Park. Mr. William Schmidt, one of the directors of the present Riverview Park Company, was one of the original members of this pleasure club. Rifle ranges were erected and the park was made use of by the members of the Club and their families for their outings."

It was not long before other societies solicited the use of the grounds and after some years the Club organized itself into a corporation known as the North Chicago Sharpshooters Association, and in addition to the use of the grounds made by the members, rented it out for picnics.

On the dissolution of this corporation Mr. William Schmidt and Mr. George Goldman became the owners of the middle section of the Park, running from the entrance on Western Avenue west to the River, and continued to rent it out for picnics. The east six acres next to Western Avenue was practically cleared of trees with the idea of ultimately devoting it to amusements, and the park proper, the old grove, as it is called, was used for the picnics.

In 1904 William M. Johnson and his partner, Joseph R. McQuaide of Pittsburg, secured the lease of what is now the middle section

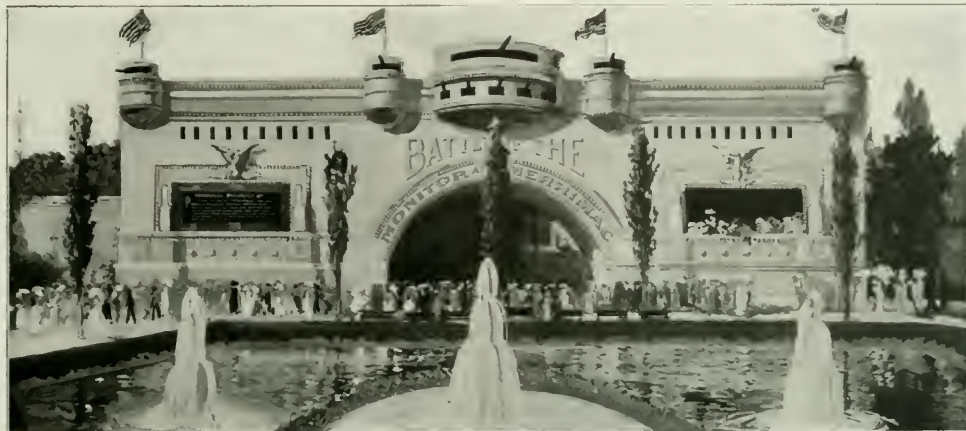
of the park from the owners, and in that year fitted up the six acres next to Western Avenue, and commenced the amusement park business. During that season the grove was under lease to other persons, but by an arrangement, the use of the grove was secured for the amusement patrons, in connection with the amusement park proper. The Park opened on July 2, 1904, its only features being a Figure 8 Coaster, a Merry-go-round and an Old Mill and Chutes combined; the latter feature was placed in the park by Mr. Paul W. Cooper, the present president of the Company, who was the first concessionaire under McQuaide and Johnson to break ground for a feature in the park.

This was the first amusement park organized or operated upon the lines of combining amusement features with a natural park, and this unquestionably will be the character of the future parks of the country, as distinguished from "show places," called amusement parks, but which have as a matter of fact no part in the proper use of that term.

The following year the Riverview-Sharpshooters Park Company was organized, with Mr. William Schmidt as President and Mr. Paul W. Cooper as Manager; this company operated the park the following year.

At the close of the season of 1905 the Park passed into the management and in a large measure the ownership of Mr. Paul W. Cooper, Mr. N. P. Valerius and Mr. William M. Johnson; Mr.

Riverview Exposition



Schmidt still remaining as director also, together with his son, George Schmidt. The executive management of the business has remained with the Messrs. Cooper, Valerius and Johnson ever since; Mr. Cooper being President, Mr. Valerius, Vice-President and Treasurer, and Mr. Johnson Secretary of what is now known as Riverview Park Company.

The Park was a success and the combination of amusement features in connection with the picnic grounds met with the approval and generous patronage of the public. From a start of six acres with a very limited capital, it has grown to over one hundred acres devoted to amusements and a thirty-acre picnic ground, and represents an investment of over \$1,000,000, all this being accomplished without the issuance of any bonds or floating any promotion schemes. From the commencement of one riding device and a few shows in tents and small buildings it has now passed into history as the largest amusement park in the World, with more riding devices within its boundaries, which run from Belmont Avenue on the South to Addison Avenue on the North, than there is upon Coney Island, New York, including all its parks and streets. It has a greater number of shows than in the parks of Coney Island combined.

The great naval show of the "Battle of the Monitor and Merrimac," as produced at Riverview Park the season of 1908, was the sensation of the amusement world, as is also "Creation," the season of 1909. This production is placed in the park in the largest, most

ornate building of its kind erected in any park, exposition, or World's Fair.

The success and the vast growth of the park, exceeding in extent that of several of our expositions, determined the Company to give it the title of an Exposition, and it is now known and conducted as the Riverview Exposition of Chicago.

The new addition of this year, known as the Lagoon, in which is placed the "Creation" Building, is without question the most beautiful addition yet placed to a park, and is in itself as large as a number of so-called parks and represents a larger investment than most of them.

The West line of the park is the North branch of the Chicago River, now being drained, purified and dredged, and it will not be long before connection will be made from the North with the channel now being sunk from the harbor at Wilmette.

Boating will soon be one of the great features of this Exposition. The ride from the Loop district to the park cannot fail to be both novel and interesting to the old resident, who remembers when the River was best handled with a shovel. The ride from the park to Evanston and Wilmette will not only prove interesting, but extremely picturesque.

The combination of amusements, grass, shade of trees and what will be soon—a beautiful stream of water—assures the element of permanency and the long continuance of the enterprise.

The Chicago Garb

Since November 1, 1906, a large proportion of the garbage of Chicago has been treated in a reduction plant, built and operated by the Chicago Reduction Company.

Prior to that date the urgent necessity of a sanitary method of disposing of garbage, animal and vegetable waste, separated from other matter, had long been keenly felt.

Chicago had the unenviable reputation of being the only city of importance using the primitive dump for its disposal. After many years of careful investigation on the part of the members of the City Council and city officials, a contract was awarded for the present system, the city still continuing to collect the garbage.

The reduction plant is located at 39th and Iron Streets, a distance of $4\frac{3}{4}$ miles to the southwest of the center of the city. It has a frontage of 380 feet on the Chicago River. A side track from the Chicago Junction Railway (Belt Line) enters its grounds. By laying a short distance of track it will become accessible also by the street car lines of the city. This furnishes transportation facilities by water, railway, street car or vehicle which are unsurpassed.

The grounds cover $3\frac{1}{2}$ acres, the buildings occupying about two-thirds of this space. The plant comprises the following:

(1) A dock 120 feet long by 80 feet wide, about 20 feet above the river level.

(2) A receiving building, 70x80 feet, in plan two stories high.

(3) Three drier buildings, 80x80 feet, two stories high.

(4) A naphtha extraction building, 38x65 feet, four stories high.

(5) A naphtha storage building, 25x30 feet, a sub-basement.

(6) A milling building, 20x40 feet, four stories high.

(7) A boiler house, 40x46 feet, two stories high.

(8) Shops, 25x120 feet, one story high.

(9) An office, 20x20 feet, one story high, with a sub-basement.

The principal buildings are of modern and permanent construction, being built of brick and reinforced concrete throughout, making them fireproof and sanitary. They are so designed as to furnish ample light by day, and are generously equipped with electric light for night labor. They form a complete series from start to finish of process, and are built with intermediate spaces so that each building may be duplicated and the capacity of the plant doubled, if required. The present capacity provides for 500 tons of garbage daily. The motive power is electricity, each apparatus being equipped with a separate electric motor. The power is furnished by the Sanitary District Company of Chicago.

The garbage is carried to the receiving stations along the river in removable steel boxes. The boxes are loaded by derricks upon scows and shipped to the plant. Where the districts are in close proximity, the garbage is carted direct. In the future the boxes may be conveyed by steam railway or by electric street cars from the outlying territory.

The dock is the receiving platform. This has a concrete foundation over which is laid a vitrified brick pavement. On the dock are two boom derricks, each with a 55-foot mast, operated by two four-drum engines. The boxes are hoisted from scow or wagon by derrick and the contents are then dumped into connected double hoppers. These are built of concrete, have a capacity of 75 tons each, and are located just outside the receiving building. After the boxes are emptied they are swung back, cleansed and sterilized in a large, deep steel vat. Large bucket elevators convey the garbage from the hoppers to the upper floor of the receiving building and deposit it on conveyors, from which all foreign material is eliminated by hand picking. The garbage then passes through crushing machines, after which the material is carried by a series of conveyors to the drying house and automatically discharged into hot-air dryers. In all there are ten dryers, eight of which are 6 feet in diameter by 40 feet long, and two are 8 feet in diameter by 75 feet in length.

These are revolving steel cylinders, to the interior of which are riveted angles to keep the material in motion as the drier shells revolve. Each drier has a capacity of $3\frac{1}{2}$ to 4 tons of wet material per hour. The dryers are heated by separate furnaces, which are equipped with apparatus for burning crude oil. Crude oil has been adopted for generating the heat necessary for drying, as it possesses many features that make it more desirable than coal. The daily consumption of oil is about 8,000 gallons. In passing through the dryers moisture to the extent of 75 per cent is eliminated from the garbage. There is also an extensive underground series of storage tanks, safety devices and pumps for the storage and handling of the crude oil.

The gases from the dryers are disposed of by a series of fans and discharged into three concrete stacks 6 feet in diameter, 200 feet high. This contains a sprinkling system for the purpose of furnishing moisture. The fans force the vapors through this sprinkling system where for the most part the vapors are absorbed and carried to the river. The remaining vapors are carried off in the upper currents of air, being small in quantity and volatile.

The material from the dryers continuously drops on a conveyor and is carried to the naphtha-extraction building, which contains several percolating tanks. These are 8 feet in diameter and 16 feet high. The dry material is confined in the percolating tanks and treated with gasoline, which separates the grease from it, the gasoline and grease being carried to separators in which the grease is separated from the gasoline and the gasoline returned to its storage tank. The process is continuous, the gasoline being used over and over again, only about 2 per cent by weight being lost during each process. The garbage, or "tankage," as it is now termed, is conveyed to the mill house. There it passes through four screens, each 4 feet in diameter and 12 feet long, of varying mesh for the different stages of the process. The tankage is then discharged into two 48-inch Stedman disintegrator after which the screened and ground material is carried by conveyor to the scale house and weighed by an automatic scale, which also dumps it directly into cars for shipment. It now contains less than 10 per

Garbage Reduction Plant

cent of moisture and less than 1 per cent of grease. The grease is put in storage tanks, weighed on tank scales and pumped into tank cars.

The boiler house contains three 253 H. P. Stirling water-tube boilers. Overhead coal bunkers carry the coal to automatic stokers of the Jones under-feed pattern. Sullivan County, Indiana, 1½ inch screenings are used for fuel. The steam is used in connection with the naphtha extraction process, to drive the pumps and the hoisting engines.

The naphtha storage consists of a large concrete vault in which are tanks with a capacity of 20,000 gallons of gasoline. The vault is covered with an iron roof, provided with openings on the sides to permit the free circulation of air to avoid the accumulation of gas.

The plant cost over \$300,000, and is owned by a stock company known as the Chicago Reduction Company. Its officers are non-resident, with the exception of its secretary and general manager, Mr. Charles Turner. Mr. Turner has been engaged in the disposition of hotel and restaurant garbage of this city for the past fifteen years. Five years ago he invented a digester which performed three separate functions at one and the same time—that of cooking, pressing and drying of garbage—without exposure during the entire treatment. The process adopted by this company is the result of the experiments and experience of Mr. Turner, who built a small plant and operated it for some time before the present works were erected. It is what is known as the drying system. The garbage, after being freed from foreign material and crushed to a uniform size, is subjected to a temperature of about 800 degrees. It is distinctive, being a combination of the features of other well-known systems, and the economy of handling and of operation is believed to be greater than that of any other plant in existence.

The by-products are grease and tankage. Garbage grease is of an oily nature, and after the glycerine and red oils have been extracted, it is used in the manufacture of cheap grades of soaps and candles.

The tankage, which is in the form of fine powder or dust, is sold to jobbers for a filler or base in compounding fertilizers. A larger percentage of grease is secured by the naphtha process, and the fertilizer base rendered of greater commercial value by reason of the grease being more fully eliminated than is possible with other methods.

The sanitary aspect both of the plant and the method of collection and delivery is deserving of especial consideration. The process is automatic as far as is possible. The floors are of concrete, and water connections are amply supplied for cleansing purposes. The garbage is collected and delivered daily at the plant, where it is promptly disposed of. The plant is located north of and immediately adjoining the Chicago packing-house district. From the experiences of other cities with reduction plants this seems a desirable feature, for, although odors peculiar to the reduction process are believed to be so disposed at this plant as not to be perceptible, yet should they escape they could not be distinguished from the various odors emanating from the stock yards region.

The contract between the city and the Chicago Reduction Company was executed on August 31, 1906, and went into effect on November 1, 1906. It provides among other requirements, for the final disposition of the garbage of the City of Chicago for a period of five years; that the city shall deliver to the contractor all garbage collected in the city; that all deliveries of garbage shall be made free of cost to contractor at its plant; that delivery of garbage shall be made in metal boxes so constructed that they may be hoisted by a crane and their contents dumped by overturning; that before being returned to the city the boxes shall be sterilized, at the expense of the contractor; that garbage must be disposed of by reduction, etc.; that the contractor shall receive the sum of \$47,500 per year, for each of the five years, provided his work be performed in strict compliance with the specifications of the contract; that the city shall have the right at the expiration of the contract period, to purchase plant used by the contractor in the performance of its contract, the manner of fixing the price being stipulated.

About 300 tons of garbage are delivered to the reduction plant daily, Sundays excepted, while many tons daily in the remote districts are still being disposed of in distant dumps. This is entirely household garbage, collected by the city. Hotel, restaurant, boarding house, commission and market garbage is collected by private contractors. This is dumped in mixed condition in the clay pits, with exception of hotel swill, so called, which is disposed of to rendering plants.

In conclusion, it can be properly and truthfully said that in the history of Chicago there has been no contract ever let that is of so great importance and benefit to the health of its inhabitants as this one—of the disposal of garbage by the Chicago Reduction Company, and it is doubtful if more than a small per cent of the people are even aware of it. They know in a general way that a change in the separation and collection has been made, involving on their part more care in sorting and placing in special receptacles, but further than that they are ignorant. It is generally known and admitted by the city officials that no contract ever let by them has been carried out and fulfilled with so little trouble and friction, and their commendation, by which the Chicago Reduction Company has so satisfactorily handled so large, and, it can also be said, so vexatious and difficult, a contract, has been freely and openly acknowledged.

Many columns in newspapers are devoted to subjects and matters of far less importance to the public than this subject, and yet little or no publicity has been given it. If for some unforeseen cause or accident the use of dumps should again be necessary, it is safe to predict that the great benefit of this manner of disposal would soon be appreciated, and a greater demand and necessity for its continuance would fill many columns in many issues of the daily papers.

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A LONG with the "Half Century of Chicago Building" and its unparalleled rapid progress towards a city of the first magnitude, can easily be seen the hands of the several staunch and well poised business men who have been alive to its possibilities, and who have put their shoulders hard to the wheel of progress, and made it roll whether or not it would.

We are all proud of our "Chicago enterprise" and her business men, especially so, her builders. The monuments to their faith stand on every city block, twenty stories high, and each day starting other new and greater projects, calling for other and greater engineering and mechanical features until we optimists are appalled at tonnage that is hauled to our buildings in unbroken packages probably to be placed on the twentieth story in its unbroken state. The Thomas Elevator Co. have seen by the signs of the times that the future, as well as the present, must be provided for with the means to meet the rapid demands made for more powerful machinery. Ten years ago, a twenty-five horse-power electric double drum hoist carrying a guarantee of 100% overload for ten consecutive minutes was thought to be, and was, powerful enough for the time. Later, fifty horse-power, with the same overload capacity, have become necessary, and now we are building them with 100 horse-power motors. Where will the necessity stop? The Thomas Elevator Co. never—at least until there is no need of, or demand for, a larger plant.

Our silent chain drive double drum electric iron hoist can be found in every big city of this country doing its share towards the building up of a "half century" record for their adopted cities. Therefore

while we have done our full share towards the "Half Century of Chicago Building" and have been the principal direct means of getting each brick, or each stone on top of the other, that have made these monuments for Chicago, we are also doing likewise in the principal cities of the United States.

We claim to be the only manufacturers making a specialty of electric hoisting machinery for contractors' use. We were the first in the market in this line and claim more practical experience in their operation than all others combined.

We are pleased to note that the principal architects throughout the large cities are specifying electric hoists, and while that is gratifying, so far as it is done, yet there seems to be no arguments left for the steam hoist, and consequently no reason why electricity should not be made universal. Electric driven hoists are capable of doing anything that can be done by steam and can do it in a much more satisfactory manner by reason of its cleanliness, its noiselessness and its absolute absence of vibration to the structure.

Chicago has a great number of sky scrapers erected wholly by electricity, in which the sound of the steam hoist was wholly absent. A number of others in which electricity was used universally above the basement. Among the recent wholly and partially created structures by electricity are the La Salle and Blackstone Hotels, University Club; the removal of the old and erection of the New City Hall, McCormick Building and many others practically all electric. This only goes to show the signs of the times, and the direction in which the finger points, and what may be expected when we are called upon to write the chronology of the next "Half Century of Chicago Building."

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